POLLUTION PREVENTION
AUDIT INSPECTION REPORT

Phillips 66 Company - Bayway Refinery

1400 Park Avenue
Linden, NJ 07036

NJ 000 1511
NJ 002 6671

May 13 & 28, 2015

Participating Personnel:

<u>U.S. Environmental Protection Agency</u>
Lampros E. Bourodimos, PhD, PE, Environmental Engineer

<u>Phillips 66 Company – Bayway Refinery</u>
Doug LaFayette, Environmental Team Lead
Meghan Nolan, MS, Environmental Engineer
George B. Bakun, MS, PE, Principal Environmental Consultant

Report Prepared By:

Lampros E. Bourodimos

Lampros E. Bourodimos, PhD, PE, Environmental Engineer

Approved for the Director By:

John S. Kushwara

John S. Kushwara, Chief
Monitoring and Assessment Branch

POLLUTION PREVENTION AUDIT INSPECTION REPORT

A. Objective

On May 13 and 28, 2015, the US Environmental Protection Agency (USEPA) conducted a pollution prevention (P2) audit inspection at the Phillips 66 Company – Bayway Refinery (the facility) physically located in Linden and Elizabeth, NJ. This P2 inspection was performed at this facility to: a) gather general information on the organization and facility; b) gather specific information that will help evaluate P2 opportunities; c) interview employees and managers about the facility's and organization's practices; d) document the present P2 program and the extent it has been implemented to date; e) evaluate the extent of environmental problems; f) evaluate future plans and measured P2 reduction; and g) provide technical assistance and suggestions for present and future P2 opportunities and alternatives.

The first P2 inspection at this facility was conducted on May 11 and July 21, 2011. This facility was selected for a re-visit P2 inspection to examine progress and improvement of the P2 program onsite as a result of the 2011 P2 inspection and subsequent report that was sent to the facility.

B. Facility Description, History, and Operational Characteristics

The Phillips 66 Company – Bayway Refinery is mainly located at 1400 Park Avenue, Linden, in Union County, New Jersey. A small portion of the site is in Elizabeth, Union County, NJ.

This production facility was built and owned on this site in 1909 by Standard Oil, which became Standard Oil of New Jersey, then Esso, was later re-named Exxon before it became ExxonMobil. After a series of subsequent sales and mergers, the facility was owned by ConocoPhillips. In 2012, Phillips 66 Company debuted as an independent energy company when ConocoPhillips executed a spin-off of assets. This spin-off consisted of ConocoPhillips' refining, marketing, and transportation assets into the new company (Phillips 66 Company). Phillips 66 Company has owned and operated the company independent of ConocoPhillips since that year.

This mega-facility is located on 1,235 acres which is organized for major petrochemical production and related activities. It includes transportation, storage, and process facilities for refining crude oil into petrochemical products. The primary SIC code for this facility is 2911 (Petroleum Refining) .

The majority of the site is owned by Phillips 66, with small portions having separate operating units run by Infineum USA LP, BP Air Turbo, GE, and DuPont. Additionally, ExxonMobil has retained all responsibility for any ongoing environmental work, such as site remediation activities resulting from historical contamination, which dates back to when the facility was owned and operated by Exxon. There are groundwater monitoring wells installed throughout the facility numbering in the hundreds. ExxonMobil no longer has an operational presence onsite. Although they are not part of this facility, ExxonMobil is one of the co-permitees (along with Infineum) to the NPDES Permit NJ0001511 and has contributing wastewater flows from their remediation wells to the facility wastewater treatment plant (WWTP).

On the site, there is a cogeneration steam and energy generating facility (Cogen) constructed on a leased property arrangement and owned by East Coast Power LLC. There is no management connection between Cogen and Phillips 66 Company. The Cogen provides onsite steam demand since the facility's own steam generation does not meet all facility needs.

The Bayway Refinery is a fuels refinery that generates motors fuels, heating oil, and liquefied petroleum gas (LPG). It is also a marketing loading facility for loading refined petrochemicals into trucks and rail tank cars.

The facility has several distributed control centers for managing and controlling analogous operations onsite for: a) fuel products; b) oil movements; c) WWTP; and others. The production facility is presently running 7 days per week, 24 hours per day. There are about 800 Phillips 66 employees on site with an additional 200 contractors. The onsite facility fire department inspects, tests, and maintains the firewater system to ensure both its availability and capacity for any emergency.

Unit turn-arounds (maintenance shutdowns) are programmed for various unit processes at different times. However, every three years or so, there is a catalytic cracking unit turn-around which includes shutdown of most of the other process units lasting several months. This usually occurs in the spring or autumn. The refining operations are shutdown usually once every five years.

The refining operations generate approximately 250,000 barrels/day of petroleum products. Sweet crudes are also refined at this facility, which is the largest oil refinery on the East Coast of the USA. Ocean tankers and/or barges bring in about 250,000 barrels/day of crude oil (usually from the North Sea), naphtha, and gas oil as feed to the refinery. Another 30,000 barrels/day of purchased feed process gas oils (PGO) are provided as heavy oils for the catalytic plant. These inputs are primarily stored in the Tremley Tankfield. The distillation capacity of the facility is about 300,000 barrels/day.

The crude petroleum is electrically desalted by adding water to it. This generates an electrostatic field and separates salt water from the desalted crude. The desalted crude and naphtha are fed to a pipe still. There, the feed is fractionated (or separated) into analogous fractions by thermal distillation. The various components are separated by their boiling range characteristics. These fractionated products are further treated to increase the yield of the desired products. The gas oil fraction is desulfurized, and along with additional PGO (purchased/process gas oil), is then hydraulically fed to the catalytic cracking unit. In the catalytic cracking unit, heat and a catalyst are used to break down high boiling non-gasoline components into lower boiling gasoline products.

The lighter distillates' (such as naphtha) octanes are upgraded by catalytic reforming in the Powerformer. In this process, high temperature and a platinum catalyst with hydrogen permit a series of chemical reactions to occur which upgrade the feed and that yield higher octane products.

Other chemical processes such as isomerization and sulfuric acid alkylation are utilized to generate required end products. Up to 250,000 barrels per day of total fuel products are produced at the refinery including: synthetic natural gas, butylenes, propylenes, and LPG.

There are 132 storage tanks grouped in fields according to the type of material stored. Total above ground storage capacity of the tankage is approximately 650 million gallons. The below ground oil storage capacity is about 8,000 gallons (for onsite uses). It is estimated that the closest above ground storage tank is 400 ft. from the Arthur Kill, while the closest to Morses Creek is about 200 feet.

Materials stored include crude, intermedia processing stocks, finished products, and chemicals used in processing. The majority of the tanks are located within the main body of the facility in areas adjacent to the processing units, while approximately 17% of the tankage is located in the outlying tankfields. An additional 32 tanks are located within the process areas and store various chemicals used by those areas, or slop oil at the WWTP. There are two separate properties that are each 40 acres in size and house tank farms. The Bayway Refinery production schematic characterizing the simplified flow plan is diagrammed in Figure 1.

There also exists a chemical manufacturing plant which is physically part of the site, although it belongs to Infineum. Chemical operations will be synopsized since although they are not part of this facility, Infineum is one of the co-permitees to the NPDES Permit NJ0001511 and is contributing wastewater flows to the WWTP.

The chemical operations are divided between the East side and West side chemical plants. The East side chemical plant receives propylene/propane from the Bayway Refining Company and produces propylene which it returns back to the refinery for use in producing LPG. Butane/butylene is also received from the refinery and concentrated into butylene. The butylene is either polymerized and sent back to the refinery for use in gasoline generation or sent to the West side chemical plant for application in producing dispersants used in lubrication oil.

The West side chemical plant produces additives for lubrication oils, zinc and copper additives, and automatic transmission fluids. A phenol alkylation is also performed either to be used in blending and/or in making a calcium additive.

About half the products manufactured at the refinery are shipped out while the others leave through the Buckeye Company pipeline which distributes petrochemicals throughout the USA. The marketing loading zone, which includes the tank field, primarily loads gasoline into trucks, but also ships out asphalt, LPG, and heating oil.

C. Facility Changes since Previous P2 Inspection of 2011

Since 2011, the facility has undergone the following changes:

- Benzene Saturation Unit (BSU) – this unit was constructed in 2012 to convert benzene to naphthalene via hydrogen saturation to meet US Government mandated specifications for benzene in gasoline. It is physically located just south of the Powerformer. The existing H_2 plant was also expanded in 2012 to create a sufficient H_2 supply to power this reaction.

- Slurry Filtering Unit – this unit was constructed in 2013 to remove solids from the catalytic tar stream through a series of filters. The operation results in a 95% reduction of solids which are sent to cement kilns under a hazardous waste code for use as fuel. Liquids are blended as a product. This unit replaced the functionality of the High Ash Fuel Oil De-Ashing Unit, which was removed from service and demolished.

- Crude Oil Unloading Terminal – Phillips 66 constructed a railcar unloading facility within the Forty Acres Tankfield in 2013 for the delivery of input petroleum products for refining and provides 30-40 % of crude input only. The terminal consists of four parallel spurs each capable of holding 30 railcars. It can receive one unit train per day, seven days a week, 52 weeks per year. This may be up to 120 rail tank cars per day, for about 79,000 barrels (3.32 million gallons) delivered daily.

- Atmospheric Relief Valves (ARV) – the installation of the ARVs was located west of the Polymerization Unit and along with the associated piping/tie-ins. The project was built for the exclusive purpose of routing releases for combustion and discharge of air emissions.

- Removal of East Retention Basin (ERB) - The facility's decades-old ERB was removed from service in 2014. This 2.1 million gallon, grade-level, basin previously received discharges of oily wastes and caustics from vacuum trucks and flow from equipment washdown. Several facilities were constructed to handle these streams, including a new vacuum truck unloading station, new containment pad, and associated equipment for directing waste caustic streams, and a new equipment/heat exchanger cleaning pad.

- Air Emission Reduction Projects – these projects were completed to reduce air emissions and included the installation of a geodesic dome roof on tank TK-239, a more energy efficient vacuum furnace, and CO controls and selective catalytic reduction (SCR) units on several furnaces throughout the refinery.

- Hurricane Sandy re-building projects – the facility sustained significant damage from Hurricane Sandy in 2012 and has spent $100 million on many projects. Some projects still remain to be done.

- Other projects - included general refinery housekeeping and non-process related changes: the demolition of unused buildings, reorganization of facilities for contract services, the construction of a blast-proof wall around the refinery's laboratory, and a program to repair and/or replace piping leading from the main refinery process areas to the waterfront loading operations.

D. Water and Wastewater

1. Water Use

The facility also has several onsite water reservoirs formed by two dams at Morses Creek (which flows through the site) that provide for some facility water needs. There is a salt water intake system from the Arthur Kill to the steam generation station.

The facility's water use and conservation strategy is based on using the lowest quality water for any use that is technically and economically practical. Presently, there are four primary sources of water used on the site:

- Brackish water from the Arthur Kill (95% of water used at the facility). Although the Arthur Kill is not a fresh water source, the use of this water is important and prominent in the facility's fresh water conservation practices by replacing fresh water in certain uses. It minimizes the use of fresh water cooling water for the majority of the facility's cooling water needs. This is the single largest conservation measure of potable water at the facility – the reliance on lower quality, non-potable water sources to meet industrial water demands.

- Fresh water from onsite reservoirs which are replenished by urban runoff from upstream municipalities (2% of water used at the facility). This raw water reduces the amount of potable water that must be purchased from New Jersey American Water Company to meet onsite fresh water, industrial use demand.

- Public utility supplied water from New Jersey American Water Company (less than 2% of water used at the facility).

- Steam purchased from the onsite, independently owned and operated Cogen facility (1% of water used at the facility).

The independent, onsite DuPont Sulfuric Acid Regeneration (SAR) Plant, that was built and began operation in 2008 within the facility, has reduced facility water use. The SAR Plant takes spent sulfuric acid and acid gas (gas containing hydrogen sulfide) and makes fresh sulfuric acid. The SAP Plant inputs come from the nearby facility outputs and other DuPont locations elsewhere. Thus, the SAR Plant and its regeneration process allowed Phillips 66 to shut down the facility's sulfur recovery units (SRUs) that were rendered obsolete, and which treated acid gas. Now, that gas is sent to the SAR Plant. It is a significant P2 measure (for 2008) since the facility's spent sulfuric acid was originally disposed and not re-used. Now, the facility's process waste is made into a fresh input product that can be used by the facility and other facilities. Water use at the SAR Plant was partially offset by the decrease in facility water use resulting from the SRU shutdown.

The facility's raw water system includes four raw water intake pumps, two holding tanks, and piping that distributes raw water onsite. Most of the raw water is treated at either of two onsite water treatment plants for industrial use only. The treatment phases include clarification, filtration, and softening. Trailer-mounted, portable reverse-osmosis equipment has been employed to treat the raw water prior to use. The purpose of the water treatment plants is to improve raw water quality so that it is suitable for industrial use. The remaining raw water is used untreated.

There is groundwater seepage into onsite underground propane and butane storage caverns owned and operated by the facility which is another minor water source that is recovered and treated at the onsite WWTP.

Input water uses are important to characterize in understanding the wastewater flows. The refinery obtains water used from several sources. The water source, application, and analogous volume can be synopsized as follows:

Source	Application Use	Flow Volume (MGD-million gallons/day)
Arthur Kill	Primarily Process water used in cleaning and once-through cooling	150.9 (salt water)
NJ American Water Company	Sanitary and related uses Process water used in: desalting of crude oil Steam generation Cooling tower make-up Polypropylene plant Infineum	2.9 (treated fresh river/well water)
Morses Creek	Raw process water Treated water Wet gas scrubber make-up Raw cooling water for air compressor Steam generation	3.5 (fresh, tidal water)
Rainwater	Contaminated (treated) Clean (segregated)	4.8
Feed	Water in petrochemicals removed in desalter	0.1
Ground Water	Site remediation Seepage into Morses Creek Caverns	0.1
Process	Air Combustion	0.2
Purchased Steam (from Cogen)	Steam applications	1.5
Offsite sources	Tankfields & Tremley Point	<0.1
	Approximate $\Sigma =$	164.1 MGD

The basic uses of water at the refinery are for once-through non-contact cooling water (NCCW) and contact process water.

Analogous water uses at the Infineum chemical plant are: chemical plant - cooling tower, process contact water, scrubber water, cleaning, and fire water.

The majority of water used and discharged is taken from the Arthur Kill and chlorinated prior to use in the once-through cooling system in the refinery and at the West side chemical plant. The intake water is chlorinated twice daily for 30 minutes of contact time.

Water withdrawn from the Morses Creek fresh water reservoir is either used raw or treated in one of two on-site water treatment plants by ion exchange prior to use. In the case of the West side chemical plant cooling tower feed, biocides are also added. Water from New Jersey American Water Company is used to supplement water from the Morses Creek reservoir as needed.

Figure 2 presents the Schematic of Water Flow at the Bayway Refinery. Figure 3 shows the Flow Balance at the Bayway Refinery.

2. Wastewater

The facility generates industrial wastewater, sanitary wastewater, and stormwater. Wastewater is generated from the manufacturing and all related processes outlined in this report. Also, much of the stormwater flows from the site are collected and sent as a wastewater flow to the WWTP, as needed, throughout the year. Other contributing industries include the wastewater flows from Infineum and DuPont (Chemours). The ExxonMobil monitoring and remediation wells mentioned earlier are used to: a) recover contaminated groundwater for treatment at the onsite WWTP and b) residual oil in the ground for recycling to the refinery.

There are four categories of separate sewer collection systems within the facility that handle the wastewater onsite:

1) Process sewers – receive process wastewater, some steam condensate, and stormwater runoff from process areas that may come into contact with a petroleum product or other hazardous substance. Wastewater flows to the facility's WWTP and is then discharged to Morses Creek downstream of Dam 2 at Outfall 002.

2) Condenser sewers - handle NCCW, cooling tower blowdown from the polypropylene plant, some steam coil condensate and stormwater runoff from some non-process areas. There are three condenser sewer discharges to the underflow weirs at Morses Creek,

joining with Outfall 002 discharge, and then finally, and ultimately, discharging through Outfall 001 at Dam 1A to the Arthur Kill.

3) Storm sewers - generally only carry stormwater but may also carry water from other sources at times (steam condensate and storage tank hydrotest water).

4) Sanitary sewers - discharge to the Linden Roselle Sewerage Authority WWTP for treatment with the exception of the Salt Water Intake Pump Station, which has a local septic tank system. The septic tank system has the required permitting.

The flow for process wastewater is relatively constant throughout a typical day. Stormwater flows may vary according to meteorological and hydrological phenomena. Process wastewater concentrations vary with the analogous production program, and the particular petrochemical or other product being generated. The wastewater discharges, type, and analogous volume can be synopsized as follows:

Discharge	Application Use	Flow Volume (MGD)
Outfall 001	Cooling tower blowdown Once-though cooling (freshwater) Once-though cooling (saltwater) Clean rainwater	160.6
Arthur Kill (Waterfront)	Salt Water Pump Station Docks	0.4
Losses to Air	Steam to atmosphere Cooling tower (freshwater) Wet gas scrubber Evaporation Miscellaneous Losses	3.4
Linden Roselle Sewerage Authority	Sanitary waste	<0.1
Offsite Wastage (intentional)	BIOX activated sludge process dissolved air flotation (DAF) API Sludge	<0.1
Steam Sales	PSE&G	<0.1
	Approximate $\Sigma =$	164.7 MGD

E. Wastewater Treatment

The first WWTP was started in 1917 with an oil-and-water separator (OWS). The present WWTP was built in 1979 and uses an extended aeration, activated sludge system. The latest expansion and updates were in 2009. There are two dams located on the receiving water body, Morses Creek. Both dams, as well as Morses Creek itself, are owned by Phillips 66 Company.

The wastewater treatment process consists of oil/water separation, neutralization and equalization, biological oxidation using activated sludge (BIOX), clarification, and dual media filtration. The WWTP is designed for a maximum flow of 15 MGD and has an average flow rate of about 8 MGD. The hydraulic detention time is about one day.

The effluent flows from the channels to API gravity separators and is neutralized before entering an equalization tank. The wastewater is then joined by the wet gas scrubber wastewater that has already been treated in the scrubber purge treating unit by oxidation, clarification, and thickening.

This combined wastewater is further treated in the BIOX activated sludge aeration basins. It has a return activated sludge (RAS) of about 50% and a waste activated sludge (WAS) of about 10%. The mixed liquor (ML) in the aeration basins in maintained at 6,000 to 10,000 mg/L. The volatile suspended solids (VSS) is about 35%. The sludge age (SA) is maintained at 30 to 40 days, and for nitrification purposes, a minimum SA of 20 days is needed. Outlet baffle boxes are used to control foam.

Sludge is settled out in the secondary clarifiers. Effluent from the secondary clarifiers passes through sand and anthracite pressure filters before discharge through Outfall 002 to Morses Creek. Sand and anthracite filters can be bypassed during hydrologic episodes. Filter backwash is returned to the BIOX aeration basins for treatment. Waste sludge from the clarifiers is thickened in a DAF thickener.

The WWTP handles flows from all industrial wastewater from the facility and from the other onsite facilities, stormwater from containment and non-containment areas. From the tank field areas, OWS are used for stormwater flow only.

The WWTP simplified flow diagram characterizing the hydraulics of the liquid and solid treatment cycle is presented in Figure 2 as part of the Schematic of Water Flow.

F. Pollution Prevention

A P2 program at this type of facility may involve the use of raw materials, processes, practices, techniques, and technologies that eliminate the release of wastes into the environment. It can be characterized as a) site management and controls; b) materials inventory and control; c) handling and storage; d) source reduction, and closed-loop and external recovery; e) changes in raw materials and products; f) improved housekeeping practices; g) operation and equipment changes; h) process modifications; and i) material recycling, re-use, and recovery.

The facility's present P2 accomplishments and future plans, as well as the technical assistance evaluation are provided on the attached P2 assessment form.

G. Findings and Conclusions

The facility has been involved in P2 efforts for several years and has completed some P2 projects. These efforts have resulted in changes to their processes and programs.

Since the last P2 inspection in 2011 the following P2 efforts were instituted:

- Environmental Operating Limits (EOLs) – The EOL program was conceived to provide facility personnel with advanced warning of potential permit exceedances. The facility's environmental permits were reviewed for quantitative conditions that, if exceeded, would result in the release of pollution. Over 1,000 limitations were identified, many of which are long-term (30-day or annual averages) and would not require immediate action. For those limitations with short term averages (about 100 limitations), tracking tags were developed within the facility's electronic control system. The limitations most likely to be exceeded were also provided with pre-alarms, designed to notify operators that the permit limitation is being approached. It provides them with sufficient time to take the necessary actions required to prevent a permit exceedance (and consequentially, a pollution release). Each pre-alarm has a Consequence of Deviation table, which tells the operators the proper reaction steps if an alarm is sounded. The EOL program took several years to develop, and was fully implemented in 2013.

- Low emission valve installation for valve replacement – the facility maintains an LDAR (Leak Detection and Repair) program, including over 60,000 valves in hydrocarbon service. Beginning in 2013, the facility implemented an internal policy requiring that any newly installed valve, or any valve taken out of service for replacement or repacking, would contain low-emissions packing. These valves (low e-valves) must be certified as "low emission" by the manufacturer, meaning laboratory tests prove that the packing yields less than 100 ppm (for block valves) or less than 500 ppm (for motor- or air-operated valves) emissions. The installation of these valves has assisted in reducing fugitive emissions. The facility representative stated that the Crude Oil Receiving Terminal, constructed in 2013-2014 with 3,163 low-emission valves in hydrocarbon service, did not experience one leak in four quarters of operation. As a comparison, the Powerformer Unit has 6,770 valves in service and 139 leaks were identified during the same time period. While all leaks in the Powerformer were addressed in accordance with the regulations, this difference highlighted how effective the low-e program is, the facility representative reported.

- Compliance with the Mobile Source Air Toxics (MSAT) rule - promulgated in 2007, it was aimed at reducing benzene in gasoline to a 0.62 volume percent by 2011. Benzene is typically formed in the reforming process at refineries and with a high octane value, it is a valuable additive for gasoline. The facility representative stated that the reformate output produced at the facility averaged about 40% benzene and was blended in small quantities with other hydrocarbon fractions to produce finished gasoline. Many potential methods were reviewed to address compliance with the MSAT rule. One design sought to maximize benzene production and purity which would allow the facility to continue to blend a small amount of benzene into gasoline but to sell the remaining benzene as a chemical feedstock. The second method would take the reformate stream and saturate the bonds in the benzene molecule with hydrogen-forming cyclohexane. This could be blended into gasoline without the concerns over toxicity posed by benzene. The final solution involved modifying the towers that produce the feed for the reformer. Thus, the points on the tower where the reformer feed were moved, and this greatly reduced the number of benzene precursors going to the reformer. As a result, the amount of benzene in the reformate stream dropped from about 40% to about 19%. This reformate stream was then saturated, as described in the second method above, forming cyclohexane. The facility representative reported that the reduction in the benzene precursors resulted in less benzene actually being produced. The success of this solution was that it resulted in the need of a smaller benzene saturation unit which cost less money. Lower fugitive emissions of benzene were realized because the streams being dealt with contained much less benzene. Additionally, less hydrogen was required to saturate the benzene which resulted in lower emissions (NOx, CO and greenhouse gas [GHG] emissions primarily) from the hydrogen plant. While the direct emissions from the hydrogen plant were reduced, so were the indirect emissions. The hydrogen plant uses the methane-steam reforming process and thus lower hydrogen demand results in less steam demand. So the emissions from producing the incremental steam were also reduced.

- CO Control - the facility has begun converting several of its larger furnaces over to CO control. This method controls the excess air to a heater based upon the concentration of CO in the flue gas. Traditional methods rely on operators to control the stack oxygen readings to a target value (about 3%). The O_2 target is subjective for each furnace and depends on many factors. CO is produced during incomplete combustion. However, if the CO level is controlled at small ppm quantities (20-30 ppm), the minimum amount of air to combust the fuel is thus needed. Since the CO is being read on ppm quantities (as opposed to O_2 being read to the nearest tenths of a percent), the combustion changes are seen much more quickly and maximum furnace efficiency can be achieved. While the goal is to maximize the furnace efficiency and use less fuel gas, the environmental benefits are significant. The facility representative stated that NO_x emissions have dropped by about 20% on the furnaces converted to CO control and greenhouse gas (GHG) emissions drop in proportion to the reduced fuel consumption. Small reductions in all criteria pollutants also result from lower fuel consumption, the facility representative added.

- <u>NO_x emissions reduction</u> - A Consent Decree entered with the USEPA in 2005 required the facility to install an SCR to achieve a specific amount of NO_x reduction. The facility representative reported that the requirement was to install SCR on two heaters and achieve a 90% reduction in NO_x. The best solution turned out to be replacing one of the two heaters. This gave the facility a 100% NO_x reduction on that old heater, meaning that a lower NO_x reduction would been needed on the remaining old heater to achieve a 90% reduction NO_x. The new heater that replaced the old heater was not subject to the Consent Decree and technically, could be constructed with Ultra Low NO_x burners and meet the NJ permitting requirements. This would have resulted in a much smaller SCR needed for the remaining old heater. The facility representative reported that the facility decided to install the SCR on both old heaters even though there was no legal or regulatory requirement to include the second old heater in the SCR design. The result was additional NO_x reductions, over and above those required by the USEPA in the Consent Decree. The facility representative added that the additional reductions have been registered with NJDEP as ERCs (emission reduction credits).

- <u>Energy Savings project</u> – the facility installed energy efficient lighting in its office buildings in 2014. The new LED lighting reduces energy consumption by 76%, which indirectly reduces pollution by not requiring the generation of that electricity in the first place (which would have emissions associated with its production). This project is estimated to save over 550,000 KWH per year.

Prior P2 projects and programs up to 2011 are reflected in the following categories:

- Redirection and re-use of spent sulfuric acid (a waste) to an onsite manufacturing process that makes fresh sulfuric acid for use at the facility.

- Removal of benzene from the wastewater and into fuel gas

- Chemical recovery and re-use
- Leak detection and repair of product and non-product output (NPO) containers
- Chemical substitution to eliminate use of chlorine
- Using inventory system to eliminate excess chemical supply

  Although requested several times during the P2 Inspection, there was no further information provided regarding pollution prevention progress since 2011. Thus the tables (1 through 5) from the 2011 P2 Inspection report are included for reference.

Table 1 presents Pollution Prevention Progress between 1987 and 2010 and outlines P2 projects in more detail.

Facility waste minimization efforts were conducted in the following categories:

- Hazardous characteristic contaminated spent sandblast abrasives
- Spent lead acid batteries
- Mixed batteries
- Spent listed hazardous K171 catalyst
- Lead contaminated abrasives and paint chips

Table 2 presents the Waste Generation Summary from 2005 to 2010 for Hazardous Wastes. The same format is provided in Table 3 which presents the Waste Generation Summary from 2005 to 2010 for Non-Hazardous Wastes. Table 4 presents the Waste Generation Summary from 2005 to 2010 for Recyclables. Finally, Table 5 presents the 2010 Waste Generation Summary for all three waste stream categories.

The facility representative provided the 2015 metrics used by the facility to determine and confirm reductions in pollution generation:

- Corporate environmental events and shared information – Phillips 66 Company has a total of fourteen refineries (in the USA and worldwide). Employees from all refineries share information and rely on "lessons learned" from each other to improve reliability and reduce environmental impacts. One example of how this is accomplished is by the reporting of "environmental events" to the entire employee group. Environmental teams from each refinery report any exceedance of an environmental permit to a group at the corporate level, who tracks and disseminates the information monthly to the entire group. It should be noted that the environmental permits for facilities in different countries will differ substantially from one another, and especially those in the USA. Internally, the facility tracks "environmental events" and reports them to the entire facility staff on a weekly basis, relative to an annual "goal." Thus, employees are aware of Bayway's environmental performance and strive to reduce environmental impacts to meet the annual goal. Each year, the facility goal is reduced, which drives the environmental performance of the facility towards zero pollution events.

- Phillips 66 Company has been tracking GHG emissions internally for 8-10 years. Refineries are compared to one another in terms of GHG emissions per BPI (barrels of processed input). Bayway is unique among Phillips 66 refineries in that the capacity of the fluid catalytic cracking unit (FCCU) is larger than the crude processing capacity. This means that the facility needs to purchase additional feed for the FCCU. Additionally, the facility has its own hydrogen plant where some other refiners use hydrogen produced on-site or nearby by third-party producers. The same situation is true for the facility for electricity and steam production. Some refineries have "native production" while other purchase electricity and/or steam. Similarly, some have cogenerated sources while others do not. According to the facility representative, while the facility accounts for the GHG from these areas, it is calculated separately from direct refinery GHG emissions. Phillips 66 Company does a great deal of benchmarking of its GHG emissions and has a good understanding of the sources and nature of those emissions and it strives to understand any differences in GHG emission from the norms established by the majority of refineries, the facility representative added.

The facility has P2 measures planned for the future. The results from the 2015 P2 Assessment Form give a total rating for the facility's P2 of 87% with a verbal value of "Good."

In comparison, the results from the 2011 P2 Assessment Form gave a total rating for the facility's P2 of 89.4% with a verbal value of "Good."

The facility has instituted and demonstrated the following comparative performance in the P2 Assessment Form categories from 2011 to 2015. Essentially, the scores in all categories were very close between 2011 and 2015.

The facility has instituted and demonstrated good efforts in: site management and control; materials inventory & control; handling & storage; and operation and maintenance processes; and material recycling, re-use, and recovery. Some of the improvement in these areas will require further evaluation of facility operations from different perspectives.

The facility still has few direct measures to determine and confirm reductions in pollution generation, and should continue to develop more of these types of metrics as they apply to the many aspects and categories related to its operations. Consideration should be given for appropriate metrics for each product and/or category manufactured. Appendix A covers Metric Development – Concepts and Suggestions. It presents a process and strategy that the facility may consider using in developing appropriate metrics for improving its P2 program.

As a result of its P2 program, the facility has reduced some waste generation. Future results of a continued P2 program at this facility may include some additional reductions in costs, waste generation, and other P2 benefits.

DESA Pollution Prevention Assessment Form for Petroleum Refinery & Terminal

Name of facility: Phillips 66 Company - Bayway Refinery

Address of facility: 1400 Park Avenue, Linden, NJ 07036

Names of responsible persons interviewed, job title, telephone number, e-mail address:

Doug LaFayette, Environmental Team Lead
(908) 523-6390, doug.lafayette@p66.com

Meghan Nolan, MS, Environmental Engineer
(908) 523-5138, meghan.e.nolan@p66.com

George B. Bakun, MS, PE, Principal Environmental Consultant
(908) 523-5896, george.bakun@p66.com

Date of interview: 28 May 2015

P2 responsibilities: Overall

Other staff in the organization or at the facility with P2 responsibilities:

Staff assigned as needed for P2 program.

Other comments: See P2 report of this facility for the inspection of 13 & 28 May 2015.

Synopsis of facility current operations/processes, activities, and future plans:
See P2 report of this facility for the inspection of 13 & 28 May 2015.

SIC code: 2911 (Petroleum Refining)

NPDES no.: NJ0001511
NJ0026671

I. General P2 Assessment

(7 out of 10 points)

a. Does your facility evaluate ways to reduce wastes produced? (0.6/0.6 point) Yes, this is done for any waste generated and waste minimization processes are applied where possible. They use a number of processes to evaluate alternatives prior to any new manufacturing or other types of P2 projects.

b. Does P2 staff have regularly scheduled meetings? (0.5/0.5 point) Work is done on a day-to-day basis. The Health, Safety, and Environmental department holds meetings weekly to monthly. The facility approach uses RBI – Real Business Improvements.

c. What is the approach to assessing and implementing P2 at the facility? (0.4/0.6 point) The waste minimization approach is used. Examples: minimize benzene manufacturing via source reduction; reformulation of No. 6 oil; use of slurry filtration systems.

d. Does the facility have a written facility policy and program (with documents) regarding P2? If so, facility must provide a copy for review. (0.5/0.6 point) Yes. Under the environmental area, and SOPs for operating processes.

e. Is there a P2 program in place at this facility? If so, explain in more detail. (0.5/0.6 point) Yes, there are is a program of P2 projects and it is ongoing.

f. Has the facility conducted a P2 assessment or audit? (0.5/0.6 point) Yes, there are internal multimedia inspections done by the facility on a regular basis. Also, the facility has a NJDEP P2 program that is updated every five years.

g. Is there a written source reduction plan related to hazardous wastes or all types of wastes? If so, facility must provide a copy for review. (0.5/0.6 point) Yes, the facility has such a plan for hazardous wastes and other types of wastes.

h. What P2 measures have been accomplished to date at this facility? Facility must explain in detail. (0.6/0.6 point) Since the last P2 inspection in 2011 the following P2 efforts were instituted: From the P2 report of 2015 for this facility, there are more details about the projects below:

- Environmental Operating Limits (EOLs)
- Low emission valve installation for valve replacement
- Compliance with the Mobile Source Air Toxics (MSAT) rule
- CO Control
- NO_x emissions reduction
- Energy Savings project – new LED lighting

i. What P2 measures are scheduled for the near future? Facility must explain in detail. (0.4/0.6 point) The projects include the following:

- The physical removal of the East Detention Basin and the replacement with better containment (this project is estimated at $150 million) which also has some P2 benefits.

j. Does the facility have an up-to-date site plan showing all existing sources of water discharges? (0.6/0.6 point) Yes.

k. Has a contractor been employed regarding any aspect of P2 or related activities? If so, explain in more detail. (0/0.6 point) No, this work is done internally from corporate or from on-site resources.

l. Measures used to determine reductions in pollution generation: (0/0.6 point) None are used although there appears to be some data that is readily available that can be applied for some metrics. The have an annual emissions statement with a three-year look-back for greenhouse gas emissions. More metrics need to be developed by the facility. The facility should consider developing metrics such as:

Weight of production per weight of wastes -> this type of metric can be developed for each type or category of output product (such as a chemical).

m. Does the facility provide P2 training for all employees and encourage them to share their ideas on how to reduce pollution? (0.3/0.6 point) Yes, there is annual training and refresher training that may cover some P2 concepts.

n. Do key personnel require additional training or in-depth training? (0.4/0.5 point) Yes, this is done depending on job categories and may include external courses on topics related to P2.

o. Does the training course include information on P2 definitions and laws? (0.3/0.5 point) Yes, to a degree for some training provided to employees.

p. Are there any management/employee initiatives or an incentive program related to P2? If so, explain in more detail. (0.3/0.5 point) Yes. They originate P2 projects with an approach that uses RBI – Real Business Improvements.

q. Has an evaluation(s) of processes at this location been done to verify which have opportunities for P2 or at least pollution reduction? It is estimated that about 20% of P2 opportunities provide 80% of the benefits. It follows that the remaining 80% of the P2 opportunities provide 20% of the benefits. Thus, opportunities at the site should be ranked to address the easiest and best opportunities first. (0.6/0.8 point) Yes, this type of general work approach used.

II. Site Management and Controls

(17.5 out of 20.5 points)

a. How have natural resources been protected? Measures include: minimizing the clearing and exposure of soil; and protecting vegetation, stream buffers, woodlands, and wetlands. (3.2/4.1 points) Yes, to some degree, given the historical exposure of the site due to the manufacturing processes conducted.

b. Has the facility instituted sediment and erosion controls on its site? These include: ensuring that stormwater flow diversions have been installed and are being maintained; ensuring that Federal and state mandated sediment and erosion P2 measures are being followed. (3.4/4.1 points) Yes, this appears to have been done, as needed, from the facility and site review that was done during the P2 inspection.

c. Has the facility conducted outfall evaluations? These include: looking for the presence of sheens, floatables, color, odor; looking for dry weather flows for color, turbidity, temperature variations; looking for deposits and stains in area of the outfall; looking for vegetative changes (overgrowth or dead and decaying); and observing damage to outfalls (physical). (3.8/4.1 points) Yes, this is part of operator rounds. The evaluation frequency is four times per day or twice per shift.

d. Are they using stormwater BMPs (best management practices)? (3.5/4.1 points) Yes, as needed, on the site and at various locations.

e. Is the site divided into sections for the purpose of stormwater flows? (3.6/4.1 points) Yes, and the sections appear to be pitched and graded accordingly.

III. Materials Inventory and Control

(12.6 out of 13 points)

a. Is the facility using a computerized inventory control system (*i.e.*, FIFO [First-In, First-Out] basis) designed to prevent materials from not been properly utilized? If so, explain in more detail. (2/2 points) Yes, the facility uses LIFO (Last-In, First-Out) for oil inventory. For parts, equipment, raw materials, and related items, a computerized inventory is used. There are periodic audits conducted for the warehouse and storage areas.

b. Are obsolete materials returned to the supplier? If not, facility must explain the procedure it uses for disposal of such materials. (0/0) Not Applicable (NA).

c. Does the facility try to order smaller and/or appropriate quantities and containers of infrequently used and small quantity materials? This tactic assists in minimizing unused and obsolete materials. If so, explain in more detail. (1.9/2 point) Yes, for materials in specific cases. The facility sizes its materials accordingly.

d. Has the facility tried to order larger containers of frequently used materials to simplify handling and cleaning of containers? If so, explain in more detail. (2/2 point) Yes, the facility follows this type of procedure.

e. Does the facility have permanent large scale storage tanks for materials handled in bulk that are sized in accordance with needs rather than having a large number of drums stored on-site? If so, explain in more detail. (2/2 point) Yes. The facility has many such large scale storage tanks.

f. Are all storage tanks and containers properly labeled? Are those with hazardous materials identified with the appropriate hazard warning? If not, or if they were properly identified by the inspector, explain in more detail. (3/3 points) Yes.

g. Does the facility have a way to use, or has it investigated the re-use of, off-specification materials? If so, explain in more detail. (1.7/2 points) Yes, materials are re-worked back into the manufacturing process(es) where possible. The next step is to reclassify the off-specification materials as a lower and/or different grade of product. They have a "slop system" (for off-specification materials) to re-work material.

IV. Handling and Storage

(13.2 out of 15 points)

a. Are there designated storage areas? If so, explain in more detail. (1.7/1.7 points) Yes. The facility has many designated storage areas depending on product and analogous categories.

b. Are storage areas clean and organized? (1.2/1.7 points) Yes, to some degree, depending on location.

c. Are containers stored in such a way that allows visual inspection for corrosion and potential for leaks? If not, explain in more detail. (1.5/1.7 points) According to the facility representative there are very few such type of "smaller" containers but inspection records are kept.

d. Are containers positioned and stacked to minimize tipping, puncturing or breaking? If not, explain in more detail. (1.5/1.7 points) Yes, containers are properly positioned.

e. Are stored items and materials covered and protected from damage, contamination or exposure? If not, explain in more detail. (1.4/1.7 points) Such materials are all within secondary containment and some are exposed.

f. Are individual tanks curbed or diked to contain contents of a tank in the case of leaking or spillage? With proper planning and design, spills can be contained and managed. Spill containment and management can reduce wastewater treatment process upsets. Spill prevention and response measures include: verifying that spill prevention plans identify areas where spills can occur; verifying that spill prevention plans identify procedures for cleaning up spills; ensuring that people designated to perform spill containment and clean-up are trained; ensuring that materials or equipment required for spill containment and clean-up are in adequate supply and serviceable; and verifying that spill plans include provisions for monitoring underground storage and transfer facilities. (1.7/1.7 points) Yes. The tank system at the facility has spill containment and management.

g. Are storage areas curbed or diked to contain leakage and minimize areas contaminated by a spill? If so, explain in more detail. (1.3/1.6 points) Yes, this appears to be followed at the time of the inspection.

h. Is one person responsible for maintaining storage areas? (1.4/1.6 points) There is routine inspection by the analogous department involved with the category and storage area. The storage areas are under the operator's control, depending on the unit.

i. Are the tanks and storage areas routinely inspected? If so, explain in more detail. (1.5/1.6 points) Yes, there are daily inspections for the operators' rounds. There are documented weekly inspections of hazardous waste and materials storage areas including accumulation areas. Secondary containment inspections are performed daily, while storage tanks are inspected monthly under API Standard 653 for tank inspection.

V. Operation & Maintenance Processes

(13.65 out of 15 points)

a. Does the facility use tank level indicators, alarms, and controls to prevent overflows? Explain in more detail. (1.25/1.25 points) Yes, and this depends on the tanks and physical arrangements.

b. Does the facility use above ground rather than below ground transfer lines? Explain in more detail. (1.1/1.25 points) Yes, except for road crossings which involve underground transfer lines. When possible, the facility is replacing underground with above ground transfer lines. Primarily, the facility uses above ground.

c. Are leak detection systems installed for underground storage tanks? (0.9/1.25 points) Yes, and the facility conducts tightness testing and has manual checks.

d. Are permanent transfer lines installed where feasible? Explain in more detail. (1.25/1.25 points) Yes.

e. Does the facility practice careful selection of corrosion resistant material for tanks, pumps, valves, and other equipment? Explain in more detail. (1.25/1.25 points) Yes, all equipment and appurtenances have standards that include corrosion resistance.

f. Are drip collectors used where parts are transferred between aqueous processing operations or equipment such as pumps with packing glands? Explain in more detail. (0.8/1.25 points) Yes, in some places there are drip pans underneath valves within secondary containment.

g. Does the facility perform preventive maintenance? If so, outline facility maintenance schedule. This maintenance should include routinely checking for leaks in valves and fittings, and immediately repairing/replacing valves and fittings. Keep equipment in good repair and perform maintenance as required. This includes: maintenance of stormwater management devices (*e.g.*, oil/water separators, retention/detention areas, inlets and catch basins); inspection and testing of equipment or mechanical systems used for stormwater management; checking that stormwater structures are intact and free of cracks, erosion, or damage; checking material storage areas for evidence of leaks, erosion, or fugitive materials. (1.25/1.25 points) Yes. The focus for preventative maintenance is on critical equipment and instrumentation.

h. Does the facility prevent or reduce wastes from unexpected process upsets by using an early warning system, where possible, and also by having spare parts on hand? Explain in more detail. (1.25/1.25 points) Yes, this is accomplished by both early warning systems and other predictive means depending on the analogous manufacturing process involved. The facility maintains an appropriate and detailed inventory of various spare parts, as well as having access to suppliers that will provide quick delivery of needed parts when needed.

i. Does the facility minimize stormwater run-on from adjacent property? Stormwater controls are important to managing the stormwater phenomena and dynamics at a site. (1.25/1.25 points) Yes, but this occurs on one acre out of the 1,300 acres of the site.

j. Does the facility prevent wastes from being discharged into stormwater collection structures? (1/1.25 points) Yes, and all off-loading, staging, and storage areas are containment areas.

k. Does the facility routinely report any observed non-stormwater discharges? (1.1/1.25 points) Yes, but non-stormwater discharges do not happen, according to the facility representative.

l. Does the facility provide training to plant personnel on good housekeeping practices? This includes the following measures: outside areas neat and orderly, any evidence of drips or leaks from operating equipment machinery is eliminated or contained, drainage conveyances clear of debris and trash, dumpster pads clean and trash free, any evidence of fugitive dust is eliminated or contained. If so, explain in more detail. (1.25/1.25 points) Yes, this is all part of annual, standard training.

VI. Material Recycling, Re-use, & Recovery

(7 out of 7.5 points)

a. Does the facility try to re-use off-specification materials in their manufacturing processes rather than dispose or return them? (3.5/3.75 points) Yes, the effort is made to re-work the material back into the processes and/or if profitable, reclassify these materials to a lower grade or type of product.

b. Does the facility re-use spent acid and alkaline volumes? Spent acid may be used to neutralize an alkaline waste stream. Conversely, spent alkali can be used to neutralize an acid waste stream. (3.5/3.75 points) Yes, spent acids are regenerated into new acid at the separate, onsite DuPont facility (Chemours) and sent back to Phillips 66 facility. The spent caustic is used to raise pH at the onsite WWTP. This facility, the Sulfuric Acid Regeneration (SAR) Plant, was built and began operation in 2008 (within Bayway) and has reduced Bayway water use.

c. Does the facility use evaporation for material recycling, re-use, and recovery? Evaporation concentrates materials for re-use and the water condensate can also be reused. (0/0) NA.

d. Does the facility use reuse mild acid rinsewater for material recycling, re-use, and recovery? The usage of mildly acid rinsewater as an influent flow to rinse, following the alkaline cleaning bath, improves the efficiency of the rinse, so less rinse water is required. (0/0) NA.

VII. Process Modification

(4.8 out of 6 points)

a. Does the facility recycle "used" water where possible? Used water can be applied in other processes and save on using additional water that may need to be purchased as an outside supply. This provides savings to production, operations, and wastewater treatment. (3/3 points) Yes, the facility has an organized series of processes to recycled used water onsite and has been successful in reducing the quantity of purchased water need at the site.

b. Has the facility considered converting to a dry floor (no open trenches) environment for process(es)? Such a hydraulic arrangement with proper piping reduces chances of spills reaching floor drains or causing upset in wastewater pretreatment plant. (0/0) NA.

c. Has the facility evaluated the possibility of a different process to reduce or eliminate the quantity of hazardous waste(s) generated? (1.8/3 points) Yes, and these evaluations continue. The facility is studying the use of FCC Catalyst as a concrete barrier additive. .

d. Has the facility evaluated the possibility of a different process to reduce or eliminate the quantity of raw material(s) needed? (0/0) NA.

e. Has the facility evaluated the possibility of a different process to reduce or eliminate the quantity of a raw material(s) leaking or going into the next phase of a production process? (0/0) NA.

P2 Rating Results (total points out of 87 points)

	Category	Maximum Points	Score	Percentage %	Verbal value
I.	General P2 Assessment	(10)	7	70	Acceptable
II.	Site Management and Control	(20.5)	17.5	85	Good
III.	Materials Inventory and Control	(13)	12.6	97	Good
IV.	Handling and Storage	(15)	13.2	88	Good
V.	Operation & Maintenance Processes	(15)	13.65	91	Good
VI.	Material Recycling, Re-use, & Recovery	(7.5)	7	93	Good
VII.	Process Modification	(6)	4.8	80	Acceptable
Total Rating for this P2 Assessment		(87)	75.75	87	Good

Percentages related to verbal values

85% and above	-	Good
70 to 85%	-	Acceptable
55 to 70%	-	Poor, Needs Improvement
below 55%	-	Unacceptable, Needs Significant Improvement

Appendix A. Metric Development - Concepts and Suggestions

1. Background

The first step in achieving an environmental (and therefore business) advantage is to recognize that there are multiple stakeholders, which include the company, its customers, employees, local communities, regulators, the public, and the environment itself. Environmental management strategies must address the needs of all stakeholders.

The second step in creating an environmental advantage is to establish environmental goals that go beyond compliance and cost avoidance, and focus on P2. To achieve compliance, ensure a safer, healthier community, and reduce the impact on the environment, a facility must eliminate or reduce waste and emissions and lower the cost of treatment and disposal.

The third step is to establish metrics to track and communicate progress toward achieving P2 goals. It is important to remember that "what gets measured gets managed." P2 metrics will provide valuable information to a facility for making decisions about new products, manufacturing processes, facility design, and other factors. Metrics allow the public and the regulators to know whether the company and its facility have been successful at reducing its impact on the environment.

Finding meaningful metrics for P2 may be challenging. Traditional "end-of-the-pipe" metrics that measure "weight of waste produced" or "pollution released to the environment" are the equivalent to counting "the number of defective products produced" rather than preventing defective products from being manufactured.

While metrics are a necessary aspect of environmental management, they may focus attention on failures and provide little opportunity for P2. Achieving P2 goals and ensuring continuous improvement depends on selecting a set of metrics that cause the right things to be measured, and thus managed, and that are easy to collect and interpret.

In addition, the metrics should be consistent with other company goals. Metrics represent the control points in the process and provide an opportunity for corrective action before a problem occurs. Although metrics should be supported and driven from the top of the organization, they should be under the control of the persons who manage the process.

A set of metrics is usually better than a single metric. This set of metrics should cascade down through the organization and be linked such that each metric measures different aspects of the P2 process.

Finally, metrics are not permanent. Instead, once the process has improved to the point where the metric no longer generates statistically meaningful data, it is time to move upstream in the process to a new metric.

Some general guidelines about metrics and their development:

1) Define who the "customers" are for the facility's metrics information. Which stakeholders care about P2 progress in your plant—top management, the regulators? What is it that these stakeholders want to see? Less money being spent on waste treatment? Less waste going to disposal? Make sure that the metrics set up will answer the communications and requirements that the company knows it has right now.

2) Set clear goals and address the question: "What is needed to be created?" For example, "To alter production processes to accomplish a 75% reduction in per-unit-of-production waste disposal as compared to calendar year 2010, and to do so by the end of 2016." The tighter the description, the more focused the activities will be. The goals should match the expectations of all involved.

3) Make the goals SMART: Specific, Measurable, Assignable, Realistic, and Time-oriented. Organize the metrics to measure progress toward the stated goals. The over-arching reality of industrial programs is "what you measure is what you get."

   Key points:

   - *Set clear baselines*. Set a time interval for which acceptable data exists to use as a baseline. Use some year, before your P2 efforts commenced, and measure against that baseline. Clearly define the terms and quantities that make up the baseline.

   - *Be strategic*. Think about the information you need in order to make the measurements, and design your information needs to be easy for people to collect. Company staff should not have to have to spend a significant fraction of their time reporting on P2. They should be doing P2 in their work. Examine information already being collected, and check if there are ways to extract what is needed.

   - *Track costs*. P2 has financial costs. It costs money to conduct in-house P2 assessments. There is a cost to implement projects that are identified by the assessments, and to measure and report on progress. One of the questions that must be asked of P2: "Does it save as much money as it costs?" Metrics need to be ready to answer questions like that.

2. The Structure of Metrics

Using an example metric of "annual facility pollution prevented," this section presents a format for metric development. By using this type of similar format, a facility may get the metrics that contain the information needed. In going through this development process, the facility will clarify what the metric is, why the facility uses it, who looks at it, and how it can be graphically portrayed. Each section of a metric's structure is outlined below, and example text is included with each subsection to help clarify things.

Example: Annual Cumulative Pollution Prevented

Section 1—Description

- *Define what the measurement will demonstrate.*

Example: "This measurement will demonstrate how much waste, by target waste type, is prevented or reduced through implementation of P2 projects."

- *Describe how the measurement will be made.*

Example: "To illustrate first-year waste reductions and progress toward goals, this measurement will compare the sum of achieved and expected first-year waste prevention or reduction quantities from P2 projects toward established goals. The measurement will include both the quantity of waste reduced from all completed P2 projects and the quantity expected to be avoided by the implementation of P2 projects that have been authorized and scheduled for completion in the present year. Projects included in the measurement will be those using source reduction, recycling techniques, and toxicity reduction, when waste generation changes to a less-restrictive type."

- *Define what processes or waste streams will be examined.*

Example: "The measure will be performed for the following waste types: RCRA hazardous waste, process waste water, liquid sanitary waste, and solid sanitary waste."

Section 2—Purpose

- *Define why the measurement is being taken, and define the baseline against which it is being compared.*

Example: "To demonstrate progress towards concurrence by 2016 with the P2 reduction requirement documented in the site P2 program plan. For a baseline, we will use CY (Calendar Year) 2010."

Section 3—Clients for Information

- *Identify the organizations that will receive the metrics information.*

Example: "The USEPA Region 2 Division of Environmental Science & Assessment, the NJDEP P2 Office, and the Phillips 66 Bayway Management Division are clients for this information."

Section 4—Explanation of Graph

- *Define the sources of information in the graph.*

Graphs will assist in metric development and refinement. Example: "Waste reductions from projects with a status of 'implemented/implementation complete' (activity has been accomplished, including construction, installation, testing, start-up, etc., and is ready to be fully operational) or 'completed' (project is fully operational and has begun to realize savings through avoiding cost, and the reduction of waste) are designated as actual reductions, while reductions from planned projects not yet completed are designated as expected reductions."

- *Describe the format of the graph.*

Example: "Actual reductions and expected reductions are graphed for calendar years 2010 through 2016. A cumulative reduction line illustrates the total reductions, both expected and actual, for all projects included in the measure."

- *Define any supplemental information included in the graph.*

Example: "A red goal line illustrates the annual reductions necessary in order to meet the 2016 goal established for each waste type."

- *Define any exceptions, qualifications, or special cases that affect the graph.*

Example: "Waste types that do not have a corresponding goal established and a 2010 baseline amount are not included in this measure. One full year's worth of waste reduction will be claimed for the year in which a project is credited for reducing waste, regardless of implementation date."

- *Include a sample graph.*

Example: "Calculated P2 metric (that was developed) on Y-axis versus the year (in months) of that data. A "goal" line for the value of the metric would be drawn horizontally and the plotted data would be compared to the goal.

Section 5—Data Collection

- *Define the types and sources of data to be collected.*

Example: "The P2 goal for each waste type listed will be gathered from site plans that list the baseline-year routine waste-generation rates, and the waste-type goals. The reductions from appropriate projects will be gathered from the facility data systems."

- *Define the data quality checks you will use.*

Example: "Site P2 coordinators will analyze project updates before the facility data systems are updated to ensure that the measurement reflects appropriate data."

- *Define how the data will be used.*

Example: "The data will be entered into the facility data systems by the site P2 coordinator from standardized forms and from quarterly project updates received from the project contacts. The information will be summarized and charted by the facility database manager."

Section 6—Frequency

- *Define the time intervals at which the measurements will be taken and to whom they will be delivered.*

Example: "The measurement will be taken quarterly and supplied to the USEPA Region 2 Division of Environmental Science & Assessment, the NJDEP P2 Office, and the Phillips 66 Bayway Management Division program manager, and the site P2 coordinators."

Parameters used by a facility team

The following metrics were the ones selected by one facility team. They are included here as helpful guidelines. They reflect the facility expectations under which that program operated, and possibly may be applicable to your situation.

- *Annual cumulative pollution prevented.*
- *Chargeback performance.* A taxation system was instituted as a negative incentive on the generation of specific waste streams. This measurement was designed to evaluate the effectiveness of that taxation system.

- *P2 opportunity assessment performance.* This measure examined the amount of waste "captured" by completed P2 assessments, and separately identified those wastes by waste type.

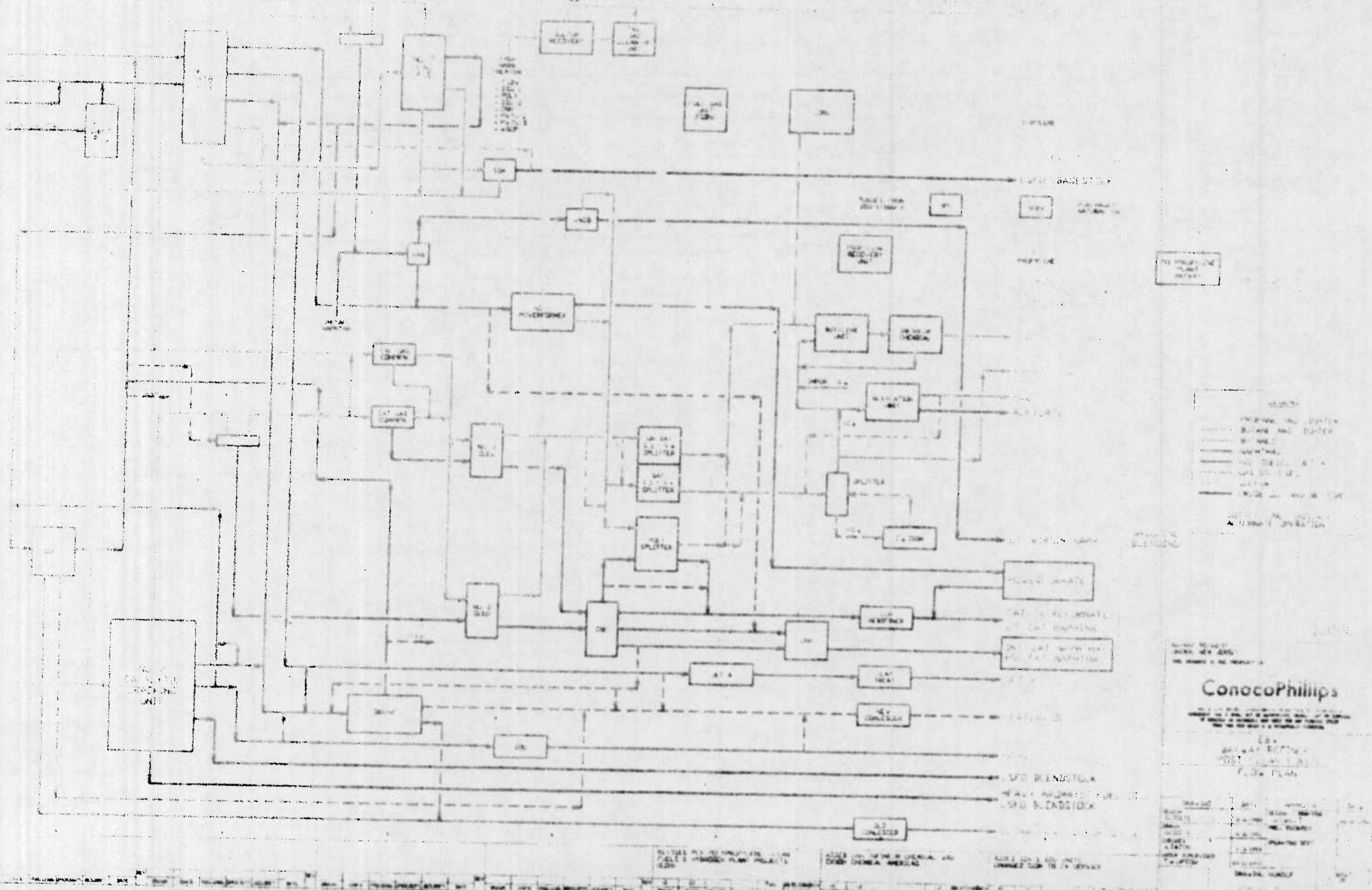
- *P2 project implementation time.* This measure examined the amount of time required to fund and implement P2 projects once they had been identified as cost-effective and feasible.

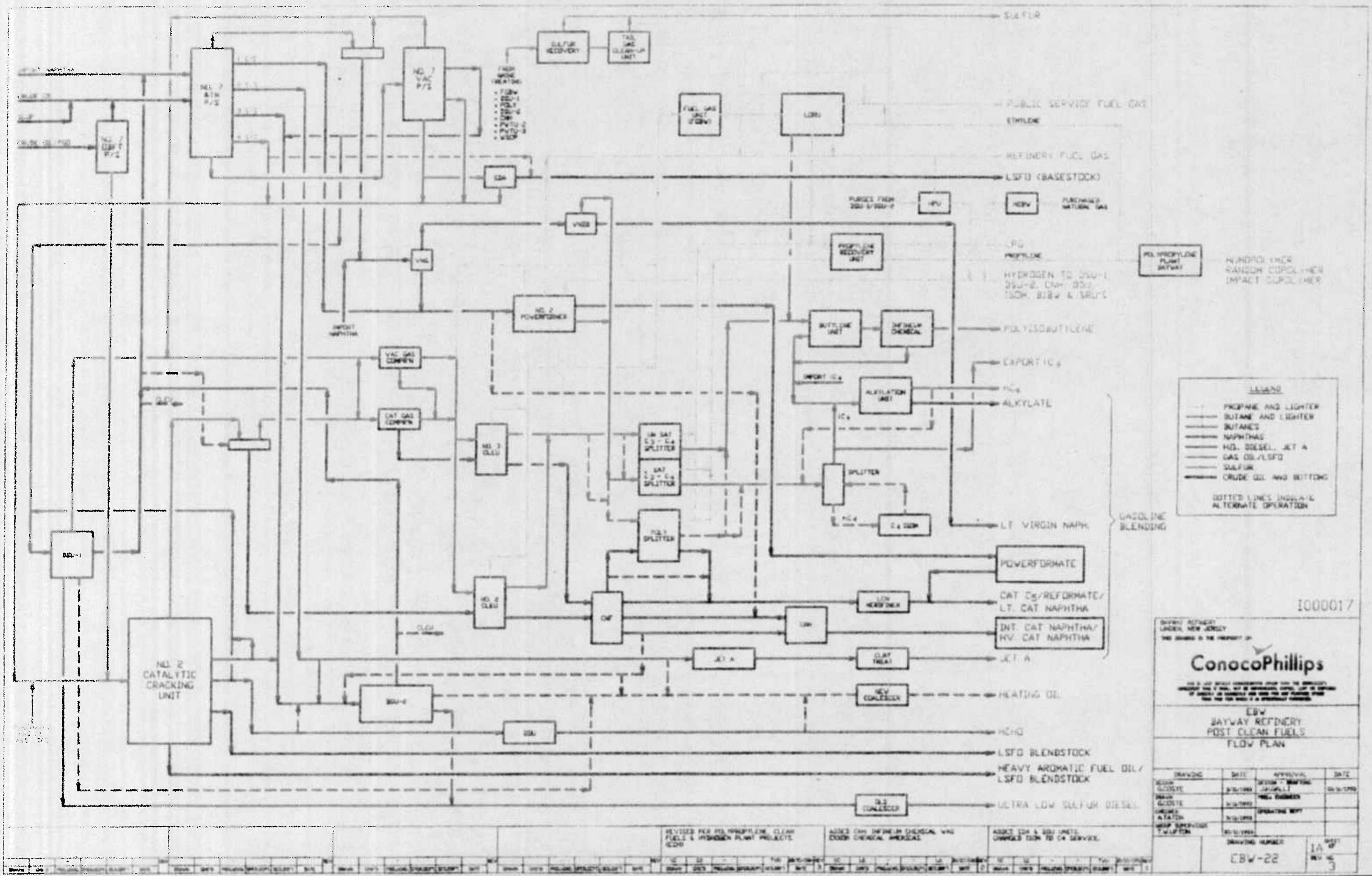
- *P2 integration.* This metric measured the degree to which P2 had been integrated into major areas of company activity. These areas included command media (company policy and guidance documents), procurement, training, regulatory compliance, and contracts.

- *P2 project cost/benefit performance.* This measurement compared P2 investment costs (initial capital investment and installation expenses) and cost savings/avoidance.

- *Affirmative procurement performance.* This measurement compared "the annual cumulative dollar value of products purchased that contained recycled materials" with "the annual cumulative dollar value of products purchased that did not contain recycled materials."

Figure 1





SULFUR
SULFUR RECOVERY
TAIL GAS CLEAN-UP UNIT
NO. 7 ATM P/S
NO. 7 VAC P/S
NO. 7 DEFT P/S
PUBLIC SERVICE FUEL GAS
ETHYLENE
REFINERY FUEL GAS
LSFO (BASESTOCK)
LPG
PROPYLENE
HYDROGEN TO DSU-1 DSU-2, CNH, DSU ISOM, BIBW & SRU'S
POLYPROPYLENE PLANT BAYWAY
HOMOPOLYMER
RANDOM COPOLYMER
IMPACT COPOLYMER
PROPYLENE RECOVERY UNIT
NO. 2 POWERFORMER
IMPORT NAPHTHA
VAC GAS COMPRN
CAT GAS COMPRN
NO. 3 CLEU
NO. 2 CLEU
BUTYLENE UNIT
INFINEUM CHEMICAL
POLYISOBUTYLENE
EXPORT IC4
IMPORT IC4
ALKYLATION UNIT
NC4
ALKYLATE
SPLITTER
POLY SPLITTER
LT VIRGIN NAPH.
GASOLINE BLENDING
POWERFORMATE
CAT C5/REFORMATE/
LT. CAT NAPHTHA
INT. CAT NAPHTHA/
HV. CAT NAPHTHA
JET A
CLAY TREAT
HEATING OIL
HCHO
LSFO BLENDSTOCK
HEAVY AROMATIC FUEL OIL/
LSFO BLENDSTOCK
ULTRA LOW SULFUR DIESEL
NO. 2 CATALYTIC CRACKING UNIT
LEGEND
PROPANE AND LIGHTER
BUTANE AND LIGHTER
BUTANES
NAPHTHAS
HO, DIESEL, JET A
GAS OIL/LSFO
SULFUR
CRUDE OIL AND BOTTOMS
DOTTED LINES INDICATE ALTERNATE OPERATION
I000017
BAYWAY REFINERY
LINDEN, NEW JERSEY
ConocoPhillips
EBW
BAYWAY REFINERY
POST CLEAN FUELS
FLOW PLAN
DRAWING NUMBER
CBW-22

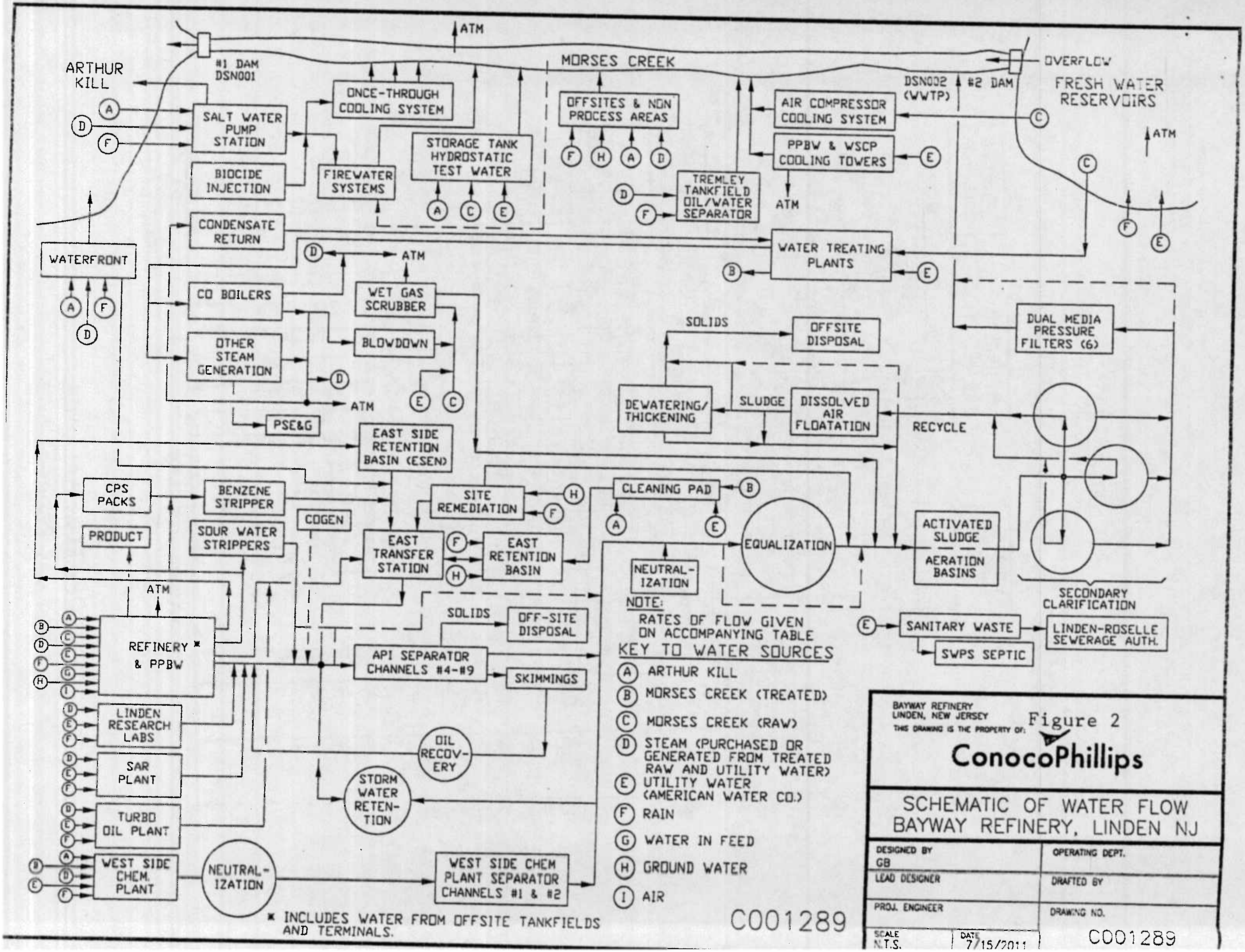
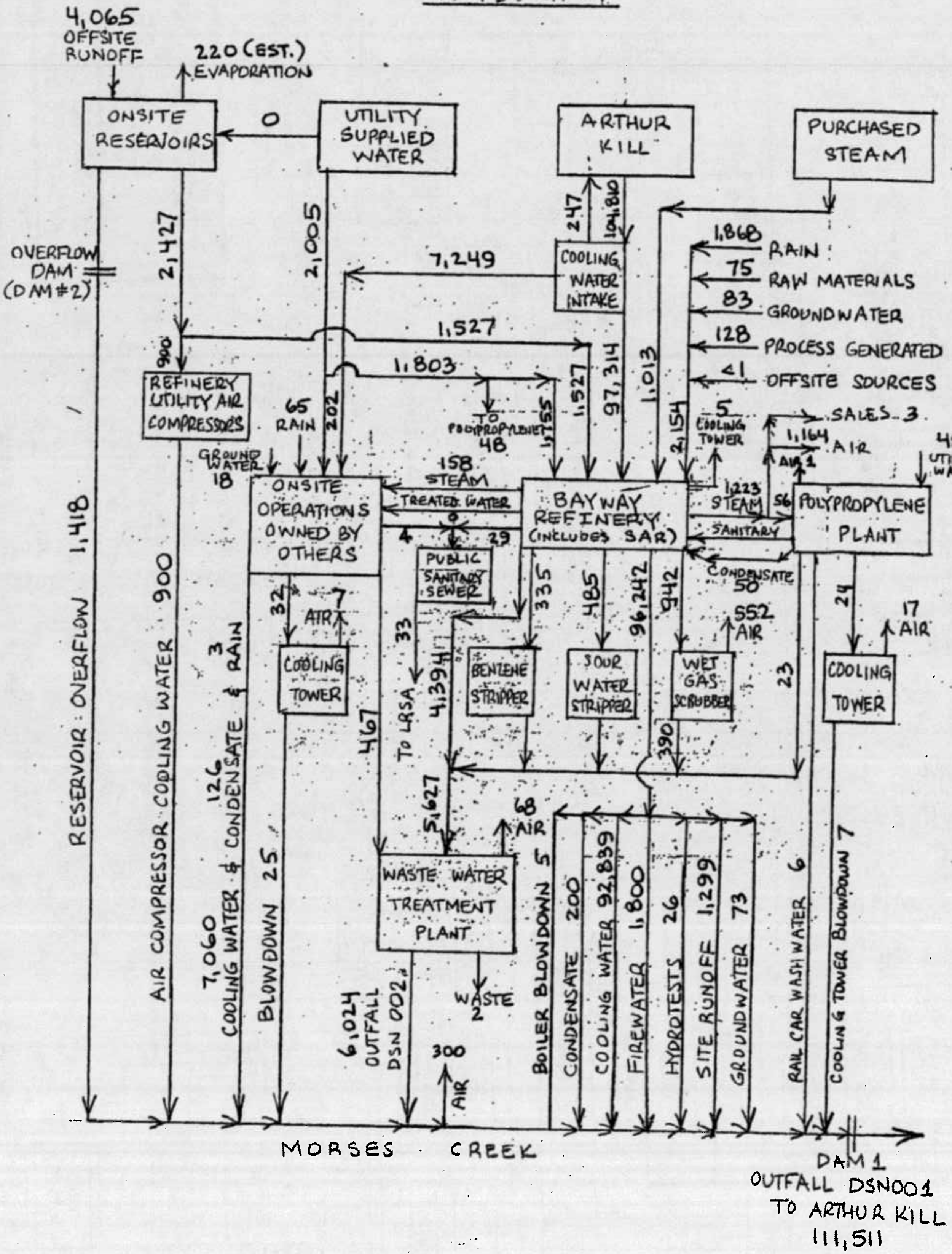

ARTHUR KILL
#1 DAM DSN001
ATM
MORSES CREEK
DSN002 (WWTP)
#2 DAM
OVERFLOW
FRESH WATER RESERVOIRS
SALT WATER PUMP STATION
BIOCIDE INJECTION
ONCE-THROUGH COOLING SYSTEM
FIREWATER SYSTEMS
STORAGE TANK HYDROSTATIC TEST WATER
OFFSITES & NON PROCESS AREAS
TREMLEY TANKFIELD OIL/WATER SEPARATOR
AIR COMPRESSOR COOLING SYSTEM
PPBW & WSCP COOLING TOWERS
CONDENSATE RETURN
WATER TREATING PLANTS
WATERFRONT
CO BOILERS
WET GAS SCRUBBER
BLOWDOWN
OTHER STEAM GENERATION
PSE&G
SOLIDS
OFFSITE DISPOSAL
DUAL MEDIA PRESSURE FILTERS (6)
DEWATERING/ THICKENING
SLUDGE
DISSOLVED AIR FLOATATION
RECYCLE
EAST SIDE RETENTION BASIN (ESEN)
CPS PACKS
PRODUCT
BENZENE STRIPPER
SOUR WATER STRIPPERS
COGEN
SITE REMEDIATION
EAST TRANSFER STATION
EAST RETENTION BASIN
CLEANING PAD
NEUTRAL- IZATION
EQUALIZATION
ACTIVATED SLUDGE
AERATION BASINS
SECONDARY CLARIFICATION
REFINERY * & PPBW
SOLIDS
OFF-SITE DISPOSAL
API SEPARATOR CHANNELS #4-#9
SKIMMINGS
SANITARY WASTE
SWPS SEPTIC
LINDEN-ROSELLE SEWERAGE AUTH.
LINDEN RESEARCH LABS
SAR PLANT
TURBO OIL PLANT
WEST SIDE CHEM. PLANT
OIL RECOV- ERY
STORM WATER RETEN- TION
NEUTRAL- IZATION
WEST SIDE CHEM PLANT SEPARATOR CHANNELS #1 & #2
NOTE:
RATES OF FLOW GIVEN ON ACCOMPANYING TABLE
KEY TO WATER SOURCES
A ARTHUR KILL
B MORSES CREEK (TREATED)
C MORSES CREEK (RAW)
D STEAM (PURCHASED OR GENERATED FROM TREATED RAW AND UTILITY WATER)
E UTILITY WATER (AMERICAN WATER CO.)
F RAIN
G WATER IN FEED
H GROUND WATER
I AIR
* INCLUDES WATER FROM OFFSITE TANKFIELDS AND TERMINALS.
C001289
BAYWAY REFINERY
LINDEN, NEW JERSEY
THIS DRAWING IS THE PROPERTY OF:
Figure 2
ConocoPhillips
SCHEMATIC OF WATER FLOW
BAYWAY REFINERY, LINDEN NJ
DESIGNED BY GB
OPERATING DEPT.
LEAD DESIGNER
DRAFTED BY
PROJ. ENGINEER
DRAWING NO.
SCALE N.T.S.
DATE 7/15/2011
C001289

Figure 3

UNITS: GPM



2008 FLOW BALANCE
BAYWAY REFINERY SITE

TABLE 1
POLLUTION PREVENTION PROGRESS BETWEEN 1987 AND 2010

Pollution Prevention Strategy	Year Implemented	Description of Strategy	Results of Strategy
1. Light Olefin Recovery from Reformulated Fuel Gas (RFG)	2002	Composition of RFG is very rich in olefin content (ethylene and propylene). The light olefin recovery unit (LORU) removes the excess ethylene and propylene from the RFG stream and diverts to the polypropylene unit.	Reduces the concentration of ethylene and propylene in the RFG that is combusted in the furnaces.
2. Reformulated Gasoline	1998	Reformulated gasoline was necessary to meet regulatory requirements.	Reduces the vapor pressure and aromatic content of gasoline sold in densely populated areas. This change results in a smaller quantity of gasoline to volatilize from automobile gas tanks. Tailpipe emissions are also reduced.
3. Refinery VOC/MACT Leak Detection and Repair	1996	Sealed surfaces are monitored at various intervals for leakage. All leaks above 1,000 ppm must be repaired within 15 days.	Reduces NPO by locating and minimizing VOC leaks to the atmosphere from sealed surfaces such as flanges, valves, pressure relief valves, pumps, compressors, etc.
4. Substitute Biocide	1996	Use Biotrol 88 or bleach in place of chlorine as a biocide in the wastewater treatment plant.	The use of Biotrol 88 or bleach eliminates the need for railcars of liquid chlorine, a TCPA regulated chemical.
5. Chemical Inventory Control	1996	Use inventory control system to eliminate an excess supply of chemicals.	Reduces the quantity of hazardous waste disposed due to obsolete chemicals and weathered drums.
6. Modify Paint Removal Procedures	1996	Paint coatings are removed by either water blasting or abrasive blasting.	Each paint removal job is evaluated to determine the best method for removing the old paint. Wet, abrasive blasting is used whenever economically feasible to reduce fugitive emissions to the air.
7. Prevent tank leaks	1996	Installation of cathodic protection, leak detection systems, and liners on new tanks and during major repairs on existing tanks. When the need arises to replace a tank bottom, a double bottom design is utilized and cathodic protection is applied as appropriate.	Reduces the potential for releases of hazardous chemicals to the soil and groundwater by providing a second impermeable barrier with a method to detect leaks from the primary tank bottom.
8. Tank Inspection Program	1996	To ensure tanks have sufficient mechanical integrity for safe and reliable service.	Reduces the potential for releases of hazardous chemicals to the soil and groundwater by minimizing the potential for excessive corrosion or structural failure of tank components.

TABLE 1 (CONTINUED)
POLLUTION PREVENTION PROGRESS BETWEEN 1987 AND 2010

Pollution Prevention Strategy	Year Implemented	Description of Strategy	Results of Strategy
9. Discharge Prevention Control and Countermeasures (DPCC) Projects	1994	Upgrade facility containment structures to minimize releases of spilled liquids. This includes adding impermeable secondary containment areas.	Reduces the quantity of contaminated soil generated by collecting spilled liquids and recycling them to the process units via the wastewater treatment plant.
10. Benzene Waste NESHAP Project	1993	Installed a benzene stripper, converted T-105 Water Scrubber to a recirculating system; collect and recycle lab samples.	Reduction in amount of benzene in refinery wastewater and benzene fugitive air emissions.
11. Increased use of vacuum trucks during plant turnarounds	1993	Vacuum trucks collect oil drains from low points in the system and other wash water from the process units and equipment during maintenance and turnaround activities.	Reduction of oil/chemicals to the sewer system during equipment turnarounds for maintenance. In addition, air emissions are reduced.
12. Waste Minimization	1993	Sulfidic caustic generated at the unsaturated splitter tower is substituted for fresh caustic at the Merifiner and the Waste Water Treatment Plant	Beneficial reuse of sulfidic caustic in place of purchase of fresh caustic.
13. Reduce Hazardous Laboratory Solvent	1993	Replace hexane with heptane as laboratory solvent in some tests.	Reduces the use of a hazardous substance.
14. Tank seal upgrades/Slotted guide pole covers	1992	As part of Refinery MACT compliance measures, vapor mounted tank seals are being replaced with liquid mounted seals. In addition, all storage tanks regulated under NSPS are retrofitted with seals on the slotted guide poles.	Reduces fugitive VOC emissions to the atmosphere including Hazardous Air Pollutants (HAPs) from these sources.
15. Powerformer MOV Body Vents	1992 – 1994	Body vents of motor-operated valves (MOVs) were repiped so that benzene and other HAPs do not enter the sewer system.	Reduction of HAPs to sewer system. Reduction of HAP emissions to air from the MOV body vents.
16. Marine Vapor Recovery System	1991	Marine vapor recovery system added at dock area.	Reduction of VOCs to the atmosphere.
17. Stopped Using Lead Paint	1990	No longer use lead-based paint for painting of tanks and piping.	No new sources of lead contamination to the ground.
18. Wastewater Treatment Plant API Separator VOC Emission Controls	2010	Replaced refinery's in-ground open top oil-water separators with above grade enclosed API separators.	The new enclosed system diverts API separator off gas to a thermal oxidizer.
19. MTBE Substitution	2006	Removal of MTBE from gasoline	Eliminates the Use and NPO of MTBE.

Table 2

Bayway Refinery
Waste Generation Summary

Hazardous Wastes (tons)	2005	2006	2007	2008	2009	2010	Total
Tank Bottoms - Tank 104				143	199		342
Tank Bottoms - Tank 103						227	227
Tank Bottoms - Tank 202				3,314	1,880	71	5,265
Tank Bottoms - Tank 208				520	281		801
Tank Bottoms - Tank 308			202				202
Tank 532					22		22
Tank Bottoms - Tank 536						208	208
Tank 554					42		42
Abrasive	70	47	70	81	63	37	368
Aerosol Cans	0	0	1	0	0	1	4
Antharacite Coal			2				2
Antifreeze				0			0
API					843		843
Ballasts					0		0
Batteries (NiCad & Mixed Cells)	10	7	5	3	3		28
Batteries (Wet Acid)	0	1					1
Base Metal Catalyst		32					32
Bunker Sludge						1	1
Catalyst - SHAC 320							-
Catalyst (Zinc Oxide)			1	2	1	9	13
Catalyst Desiccant (R112)					35		35
Caustic Solution				47			47
Concrete / Soil				4,353	3,856		8,209
Congealed Oil	2						2
Crude Oil Sediment	45	42					87
ERB Process Sludge Solids			89	2,473			2,562
Exchanger Sludge	10	4	5	18	15	40	92
Fiberglass & Paint Chips				0			0
Filtercake (From IMTT - Bayonne)	667						667
Freon 113	0						0
Gasoline Filters	3	4	5	2	0		14
Lab Waste (Misc. & Lab Packs)	0	1	1	1	1	1	5
Mercury			0				0
Mercury Switches					0		0
Mineral Oil and Catalyst	0						0
NPTMS					0		0

Table 2 (Continued)

Bayway Refinery
Waste Generation Summary

Hazardous Wastes (tons)	2005	2006	2007	2008	2009	2010	Total
Oily Debris	5	2					7
Organic Peroxide	0	0	0	0	0	0	1
Outdated Polymer				1			1
Poly Beads				8			8
Process Sewer Sludge	8	11	4	1	5	6	35
RRS Cement Kiln Fuel - K170					135	6,345	6,480
Red Dye	2						2
Residuals, Tanks & Drums	5	3			8		16
Roof Seals					1		1
API Rust & Scale			3				3
Separator Sludge / Solids	852	763	677	811			3,103
Slurry Oil Sediment - Tank 202	1,084	2,064	2,234			2	5,384
Sodium Persulfate					0		0
Soil	2,118	42	192				2,352
Spill Debris					0		0
Strainer Solids (P5 / K170)	1	1	1	0	0		4
Tank Bottoms	2			8		17	27
TEAL	1	6	4	4	3	5	23
Waste Paint	6	6	4	5	8	5	34
Xylene Wipes	0	0	1	0	1	1	4
Total	4,893	3,037	3,501	11,797	7,404	6,976	37,609

Table 3

Bayway Refinery
Waste Generation Summary

Non Hazardous Wastes (tons)	2005	2006	2007	2008	2009	2010	Total
Abrasive	343	780	232	596	464	553	**2,968**
Activated Granular Carbon Dust	14	18					**32**
AFF Foam			2				**2**
Asbestos	9	65	59	153	320	152	**758**
Asphalt / Pipe				32	1,267	2	**1,301**
Asphalt / Soil / Stone						36	**36**
Automotive Tires		8					**8**
BIOX Cake	5,628	7,035	8,454	7,871	7,461	6,464	**42,913**
BIOX Filter Media			50				**50**
BIOX Sludge					93		**93**
Black Oil & Debris		16			9	2	**27**
Carbon Filters					2	35	**37**
Carbonized Coke Chunks					96	58	**154**
Cat Tar & Stone	1		12				**13**
Catalyst (FCCU)	70	125	19	2	381	107	**704**
Coke Dust & Soot	1	0					**1**
Concrete Additive					0		**0**
Concrete Chips			1				**1**
Construction Debris	2,795	2,142	1,712	2,218	2,210	2,162	**13,239**
Construction Debris (Tremley)	6	6	12			4	**28**
Contaminated Diesel Fuel					1		**1**
Crude / Stone /Dirt						47	**47**
Crushed Glass	40	53	42	73	39	51	**298**
DCPDMS / Mineral Oil						1	**1**
Desiccant	104	46		38	123		**311**
Epoxy / Fiberglass Chips	0	18	5		11	2	**36**
Epoxy Tank Liner					1		**1**
Fiberglass & Rust Scale						6	**6**
Filter Media	14	292	18	127	8		**459**
Filter Charcoal / Filter Sand					6		**6**
Fluorescent Bulbs	0	1	1	0	0	1	**3**
Foam					0		**0**
Garbage / Trash	593	767	780	704	781	618	**4,243**
Garbage / Trash (Tremley)	4						**4**
General Plant Refuse	15	23	51	49	28		**166**
Gunite						47	**47**
Heavy Oil w/ Paint Chips						3	**3**
Inerts			19	36	42		**97**

Table 3 (Continued)

Bayway Refinery
Waste Generation Summary

Non Hazardous Wastes (tons)	2005	2006	2007	2008	2009	2010	Total
Ion Exchanger Resin	11	6	13			2	32
Jet Filter Cartridges	0	7	8	5	8		28
Jet Filter Clay			3	1			4
Lab Waste	0		4	0	5	1	10
Lumber (creosote coated & non-coated)				180			180
MEA Filter Cartridges	13	20	2	1	10		46
Medical Waste	0	0					0
Molecular Sieve		101	68	105	183	36	493
Mud / Catalyst						1	1
Oily Insulation					5		5
Oily Speedi-Dri						3	3
Oily Stone					86		86
Pall Rings				25			25
PEEB Mineral Oil					0	0	1
Poly Dust					12	12	24
Polymer (Waste / Outdated / Virgin)		3	0	1	0		4
PGO Chips	79						79
Processed Oily Tk Bottoms			692				692
Propylene Pellets (Resing & Beads)	49	46	6	13	0		114
Refractory	18	283	28	23	216	28	596
Roof Seals	2	38	9			2	51
Rust & Scale	18	39	60	4	1		122
Rust Roof / Steel Shot						3	3
Screens (Oily & Mesh)					6		6
Sludge					1		1
Soda Ash				27	17	1	45
Soil / Gravel	15	52	118	15		315	515
Spill Debris	99	401	175	209	357	311	1,552
Storm Sewer Sludge					2		2
Stretford Cake			0	93	289	221	603
Stretford Contaminated Wood					92		92
Sulfur Residue	11	9	3	50		6	79
Tank / Drum Bottoms	2	13	0	11	9		35
Zeolite					7		7
Total	**9,955**	**12,413**	**12,658**	**12,663**	**14,643**	**11,293**	**73,626**

Table 4

Bayway Refinery
Waste Generation Summary

Recyclables (tons)	2005	2006	2007	2008	2009	2010	Total
API				41			**41**
Automotive Tires	9	10	6	5	11	7	**48**
Cardboard / Office Paper		28	61	74	44	60	**267**
Catalyst (CoMo)					32		**32**
Catalyst	551	671	19	682		892	**2,815**
Catalyst (Palladium)				8	3		**11**
Catalyst (Precious Metal)	16	16	15	89	37		**173**
Catalyst (R-19)					42		**42**
Caustic Solution				133			**133**
Commingled Glass, Plastic & Cans		5	8	7	5	2	**27**
Crushed Concrete	24,000	43,575	6,200	2,277			**76,052**
ERB				16			**16**
Filter Media		14					**14**
HAFO Oil				27	31		**58**
Inerts	37	23					**60**
Jet Clay	1,053	412	288	375	398	383	**2,909**
Molecular Sieve						1,036	**1,036**
Offspec Polypropylene Resin & Beads		1,151		1,387	944	16	**3,498**
Pallets		90	8	19		5	**122**
PC Monitors & Accessories		11	10	19	9	5	**54**
PGO & Mud		24					**24**
Primary Sludge Solids			104	16			**120**
Scrap Iron & Steel	741	831	415	1,561	2,126	1,615	**7,289**
Soil	174	753	332	3,841	1,643	12,258	**19,001**
Spent Catalyst (Rail)	3,210	2,559	2,559	2,130	1,861	3,919	**16,238**
Spent Catalyst (Truck)					2,943	4,921	**7,864**
Spent Sulfuric Acid	49,953	44,824	56,973	5,815			**157,565**
Total	**79,744**	**94,997**	**66,998**	**18,522**	**10,129**	**25,119**	**295,509**

Table 5

2010 Waste Summary

Waste Stream	Waste Type	Annual Volume	Units	Disposal Method	Company Name
Recyclables					
Jet Clay	non haz	383.01	tons	Recycle	Casie ProTank / MART
Soil	non haz	12,257.94	tons	Recycle	Casie ProTank / MART
Spent Catalyst (Rail)	non haz	3,919.46	tons	Recycle	LaFarge Canada
Spent Catalyst (Truck)	non haz	1,002.00	tons	Recycle	LaFarge Ravena
Catalyst	haz	891.95	tons	Metal Reclaim	GCMC
PC Monitors & Accessories	universal	5.29	tons	Demanufacture	Intechra
	Total	**18,460**	**tons**		
Non-Hazardous Wastes					
Black Oil & Debris	non haz	2.30	drums	Incineration	Clean Harbors
DCPDMS / Mineral Oil	non haz	0.75	drums	Incineration	Clean Harbors
PEEB Mineral Oil	non haz	0.31	drums	Incineration	Clean Harbors
Abrasive	non haz	552.51	tons	Landfill	Veolia ES Greentree Landfill
Asbestos	non haz	173.40	tons	Landfill	Veolia ES Greentree Landfill
Asphalt / Soil / Stone	non haz	35.54	tons	Landfill	Veolia ES Greentree Landfill
Asphaltine	non haz	2.28	tons	Landfill	Veolia ES Greentree Landfill
BIOX Cake	non haz	6,464.46	tons	Landfill	Veolia ES Greentree Landfill
Carbon	non haz	34.96	tons	Landfill	Veolia ES Greentree Landfill
Coke Chunks	non haz	58.34	tons	Landfill	Veolia ES Greentree Landfill
Crude Oily Bags	non haz	6.29	tons	Landfill	Veolia ES Greentree Landfill
Crude / Stone / Dirt	non haz	46.69	tons	Landfill	Veolia ES Greentree Landfill
Crushed Glass	non haz	51.28	tons	Landfill	Veolia ES Greentree Landfill
FCCU Catalyst	non haz	107.32	tons	Landfill	Veolia ES Greentree Landfill
Fiberglass & Paint Chips	non haz	12.05	tons	Landfill	Veolia ES Greentree Landfill
Filter Charcoal	non haz	1.67	tons	Landfill	Veolia ES Greentree Landfill
Filter Media	non haz	12.95	tons	Landfill	Veolia ES Greentree Landfill
Fluorescent Bulbs	non haz	0.73	tons	Landfill	Veolia ES Greentree Landfill
Molecular Sieve	non haz	35.89	tons	Landfill	Veolia ES Greentree Landfill
Refractory	non haz	74.19	tons	Landfill	Veolia ES Greentree Landfill
Spill Debris	non haz	311.39	tons	Landfill	Veolia ES Greentree Landfill
Stretford Cake	non haz	221.12	tons	Landfill	Veolia ES Greentree Landfill
Construction Debris	non haz	2,161.62	tons	Landfill	Union County Transfer Station*
Const. Debris	non haz	4.30	tons	Landfill	Union County Transfer Station*
Dry Oil & Mill Scale	non haz	0.09	tons	Landfill	Veolia ES Greentree Landfill
Fiberglass & Rust Scale	non haz	6.29	tons	Landfill	Veolia ES Greentree Landfill
Garbage / Trash	non haz	618.22	tons	Landfill	Union County Transfer Station*
Heavy Oil w/ Paint Chips	non haz	3.38	tons	Landfill	Veolia ES Greentree Landfill
Ion Exchanger Resin	non haz	1.52	tons	Landfill	Veolia ES Greentree Landfill
Lab Waste	non haz	1.21	tons	Landfill	Veolia ES Greentree Landfill
Mud / Catalyst	non haz	1.06	tons	Landfill	Veolia ES Greentree Landfill
Mud / Shells	non haz	0.09	tons	Landfill	Veolia ES Greentree Landfill
Oily Dirt	non haz	0.19	tons	Landfill	Veolia ES Greentree Landfill
Oily Speedi-Dri	non haz	2.69	tons	Landfill	Veolia ES Greentree Landfill
PGO	non haz	0.12	tons	Landfill	Veolia ES Greentree Landfill
Poly Dust	non haz	19.56	tons	Landfill	Veolia ES Greentree Landfill
Purolite Resin	non haz	0.17	tons	Landfill	Veolia ES Greentree Landfill
Roof Seals	non haz	1.91	tons	Landfill	Veolia ES Greentree Landfill
Rust Roof / Steel Shot	non haz	3.04	tons	Landfill	Veolia ES Greentree Landfill
Sludge / Stone / Speedi-Dri	non haz	1.47	tons	Landfill	Veolia ES Greentree Landfill
Soil	non haz	314.57	tons	Landfill	Veolia ES Greentree Landfill
Sulfur Residue	non haz	5.72	tons	Landfill	Veolia ES Greentree Landfill
	Total	**11,354**	**tons**		

* Union County waste flow control requires shipment to a county designated site

Table 5 (Continued)

2010 Waste Summary

Waste Stream	Waste Type	Annual Volume	Units	Disposal Method	Company Name
Hazardous Wastes					
Aerosol Cans	haz	0.60	13 drums	Incineration	Clean Harbors
Catalyst - SHAC 320	haz	5.86	40 drums	Incineration	Clean Harbors
Exchanger Sludge	haz	7.62	47 drums	Incineration	Clean Harbors
Exchanger Sludge	haz	18.61	97 drums	T & D	Casie ProTank / MART
Gasoline Filters	haz	0.36	4 Totes	Incineration	Clean Harbors
Lab Waste (Misc. & Lab Packs)	haz	0.67	12 drums	Incineration	Clean Harbors
Process Sewer Sludge	haz	1.33	6 drums	Incineration	Clean Harbors
Process Sewer Sludge	haz	4.49	18 drums	T & D	Casie ProTank / MART
Strainer Solids (P5 / K170)	haz	0.50	3 drums	Incineration	Clean Harbors
TEAL	haz	4.52	Lb.	Incineration	Clean Harbors
Waste Paint	haz	4.68	18 drums	Incineration	Clean Harbors
Xylene Wipes	haz	0.51	12 drums	Incineration	Clean Harbors
Bunker Sludge	haz	1.09	6 drums	Incineration	Clean Harbors
Cleaning Fluid (Off-Spec)	haz	0.25	1 drums	Incineration	Clean Harbors
Hex-Chrome Tyvek / Gloves	haz	0.08	drums	Incineration	Clean Harbors
NPTMS	haz	0.28	2 drums	Incineration	Clean Harbors
Oily Debris	haz	0.43	4 drums	Incineration	Clean Harbors
Organic Peroxide	haz	0.21	3 drums / Lb.	Incineration	Clean Harbors
Residuals, Tanks & Drums	haz	0.44	2 drums	Incineration	Clean Harbors
Xylene Contaminated PPE	haz	0.21	2 drums	Incineration	Clean Harbors
API	haz	435.29	tons	T & D	Casie ProTank / MART
Tank Bottoms	haz	16.59	tons	T & D	Casie ProTank / MART
Slurry Oil Sediment - Tank 202	haz	70.92	tons	T & D	Casie ProTank / MART
Batteries (NiCad & Mixed Cells)	haz	0.45	3 drums	T & D	Stablex
Batteries (Wet Acid)	haz	2.02	3 pallets	T & D	Stablex
Abrasive	haz	36.93	tons	T & D	Stablex
Catalyst (Zinc Oxide)	haz	3.00	10 drums	Disposal	Stablex Canada
RRS Cement Kiln Fuel - K170	haz	6,325.82	tons	Fuel	Buzzi / Systech / Essroc
Tank Solids - Tank 103	haz	226.70	tons	Fuel	Buzzi / Systech / Essroc
Tank Solids - Tank 536	haz	57.62	tons	Fuel	Buzzi / Systech / Essroc
	Total	**7,228**	**tons**		
	Grand Total	**37,041**	**tons**		

EPA

United States Environmental Protection Agency
Washington, D.C. 20460

Water Compliance Inspection Report

Section A: National Data System Coding (i.e., PCS)

Transaction Code		NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N	2 5	3 NJ0091511 11	12 150528 17	18 3	19 R	20 2

Remarks

21 66

Inspection Work Days	Facility Self-Monitoring Evaluation Rating	BI	QA	Reserved	
67 14 69	70 3	71 N	72 N	73 74	75 80

Section B: Facility Data

Name and Location of Facility Inspected *(For industrial users discharging to POTW, also include POTW name and NPDES permit number)* Phillips 66 Bayway Refinery 1400 Park Avenue Linden, NJ 07036	Entry Time/Date 9:40 am 13 May 2015	Permit Effective Date —
	Exit Time/Date 2:30 pm 28 May 2015	Permit Expiration Date —
Name(s) of On-Site Representative(s)/Title(s)/Phone and Fax Number(s) Meghan Nolan (908) 523-5138 Environmental Engineer	Other Facility Data *(e.g., SIC NAICS, and other descriptive information)*	
Name, Address of Responsible Official/Title/Phone and Fax Number Doug LaFayette Environmental Team Lead (908) 523-6390 Contacted ☑ Yes ☐ No		

Section C: Areas Evaluated During Inspection *(Check only those areas evaluated)*

☑ Permit	☐ Self-Monitoring Program	☐ Pretreatment	☐ MS4
☑ Records/Reports	☐ Compliance Schedules	☑ Pollution Prevention	☐ Multimedia
☑ Facility Site Review	☐ Laboratory	☑ Storm Water	
☑ Effluent/Receiving Waters	☑ Operations & Maintenance	☐ Combined Sewer Overflow	
☑ Flow Measurement	☑ Sludge Handling/Disposal	☐ Sanitary Sewer Overflow	

Section D: Summary of Findings/Comments

(Attach additional sheets of narrative and checklists, including Single Event Violation codes, as necessary)

SEV Codes	SEV Description
☐☐☐☐☐☐	
☐☐☐☐☐☐	
☐☐☐☐☐☐	
☐☐☐☐☐☐	

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Phone and Fax Numbers	Date
Lampros E. Bourodimos	USEPA-2DESA-MAB-MOS	28 May 2015
Lampros E. Bourodimos		
Signature of Management Q A Reviewer	**Agency/Office/Phone and Fax Numbers**	**Date**
John S. Kushwara	EPA/DESA-MAB/732-321-6686/6616	4/7/16

EPA Form 3560-3 (Rev 1-06) Previous editions are obsolete.

INSTRUCTIONS

Section A: National Data System Coding *(i.e., PCS)*

Column 1: Transaction Code: Use N, C, or D for New, Change, or Delete. All inspections will be *new* unless there is an error in the data entered.

Columns 3-11: NPDES Permit No. Enter the facility's NPDES permit number - third character in permit number indicates permit type for U=unpermitted, G=general permit, etc.. *(Use the Remarks columns to record the State permit number, if necessary.)*

Columns 12-17: Inspection Date. Insert the date entry was made into the facility. Use the year/month/day format (e.g., 04/10/01 = October 01, 2004).

Column 18: Inspection Type*. Use one of the codes listed below to describe the type of inspection:

A Performance Audit
B Compliance Biomonitoring
C Compliance Evaluation (non-sampling)
D Diagnostic
F Pretreatment (Follow-up)
G Pretreatment (Audit)
I Industrial User (IU) Inspection
J Complaints
M Multimedia
N Spill
O Compliance Evaluation (Oversight)
P Pretreatment Compliance Inspection
R Reconnaissance
S Compliance Sampling

U IU Inspection with Pretreatment Audit
X Toxics Inspection
Z Sludge - Biosolids
Combined Sewer Overflow-Sampling
$ Combined Sewer Overflow-Non-Sampling
+ Sanitary Sewer Overflow-Sampling
& Sanitary Sewer Overflow-Non-Sampling
^ CAFO-Sampling
= CAFO-Non-Sampling
2 IU Sampling Inspection
3 IU Non-Sampling Inspection
4 IU Toxics Inspection
5 IU Sampling Inspection with Pretreatment
6 IU Non-Sampling Inspection with Pretreatment
7 IU Toxics with Pretreatment

! Pretreatment Compliance (Oversight)
@ Follow-up (enforcement)
[Storm Water-Construction-Sampling
] Storm Water-Construction-Non-Sampling
: Storm Water-Non-Construction-Sampling
~ Storm Water-Non-Construction-Non-Sampling
< Storm Water-MS4-Sampling
- Storm Water-MS4-Non-Sampling
> Storm Water-MS4-Audit

Column 19: Inspector Code. Use one of the codes listed below to describe the *lead agency* in the inspection.

A — State (Contractor)
B — EPA (Contractor)
E — Corps of Engineers
J — Joint EPA/State Inspectors—EPA Lead
L — Local Health Department (State)
N — NEIC Inspectors

O— Other Inspectors, Federal/EPA (Specify in Remarks columns)
P— Other Inspectors, State (Specify in Remarks columns)
R — EPA Regional Inspector
S — State Inspector
T — Joint State/EPA Inspectors—State lead

Column 20: Facility Type. Use one of the codes below to describe the facility.

1 — Municipal. Publicly Owned Treatment Works (POTWs) with 1987 Standard Industrial Code (SIC) 4952.
2 — Industrial. Other than municipal, agricultural, and Federal facilities.
3 — Agricultural. Facilities classified with 1987 SIC 0111 to 0971.
4 — Federal. Facilities identified as Federal by the EPA Regional Office.
5 — Oil & Gas. Facilities classified with 1987 SIC 1311 to 1389.

Columns 21-66: Remarks. These columns are reserved for remarks at the discretion of the Region.

Columns 67-69: Inspection Work Days. Estimate the total work effort (to the nearest 0.1 work day), up to 99.9 days, that were used to complete the inspection and submit a QA reviewed report of findings. This estimate includes the accumulative effort of all participating inspectors; any effort for laboratory analyses, testing, and remote sensing; and the billed payroll time for travel and pre and post inspection preparation. This estimate does not require detailed documentation.

Column 70: Facility Evaluation Rating. Use information gathered during the inspection (regardless of inspection type) to evaluate the quality of the facility self-monitoring program. Grade the program using a scale of 1 to 5 with a score of 5 being used for very reliable self-monitoring programs, 3 being satisfactory, and 1 being used for very unreliable programs.

Column 71: Biomonitoring Information. Enter D for static testing. Enter F for flow through testing. Enter N for no biomonitoring.

Column 72: Quality Assurance Data Inspection. Enter Q if the inspection was conducted as followup on quality assurance sample results. Enter N otherwise.

Columns 73-80: These columns are reserved for regionally defined information.

Section B: Facility Data

This section is self-explanatory except for "Other Facility Data," which may include new information not in the permit or PCS (e.g., new outfalls, names of receiving waters, new ownership, other updates to the record, SIC/NAICS Codes, Latitude/Longitude).

Section C: Areas Evaluated During Inspection

Check only those areas evaluated by marking the appropriate box. Use Section D and additional sheets as necessary. Support the findings, as necessary, in a brief narrative report. Use the headings given on the report form (e.g., Permit, Records/Reports) when discussing the areas evaluated during the inspection. The heading marked "Multimedia" may indicate medias such as CAA, RCRA, and TSCA.

Section D: Summary of Findings/Comments

Briefly summarize the inspection findings. This summary should abstract the pertinent inspection findings, not replace the narrative report. Reference a list of attachments, such as completed checklists taken from the NPDES Compliance Inspection Manuals and pretreatment guidance documents, including effluent data when sampling has been done. Use extra sheets as necessary.

*Footnote: In addition to the inspection types listed above under column 18, a state may continue to use the following wet weather and CAFO inspection types until the state is brought into ICIS-NPDES: K: CAFO, V: SSO, Y: CSO, W: Storm Water 9: MS4. States may also use the new wet weather, CAFO and MS4 inspections types shown in column 18 of this form. The EPA regions are required to use the new wet weather, CAFO, and MS4 inspection types for inspections with an inspection date (DTIN) on or after July 1, 2005.

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Sections F thru L: Complete on all inspections, as appropriate. N/A = Not Applicable	PERMIT NO. NJ0001511

SECTION F - Facility and Permit Background

ADDRESS OF PERMITTEE IF DIFFERENT FROM FACILITY *(Including City, County and ZIP code)*	DATE OF LAST PREVIOUS INVESTIGATION BY EPA/STATE: 12 May & 21 Jul 2011
	FINDINGS

SECTION G - Records and Reports

RECORDS AND REPORTS MAINTAINED AS REQUIRED BY PERMIT. ☑ YES ☐ NO ☐ N/A *(Further explanation attached ______)*

DETAILS:

(a) ADEQUATE RECORDS MAINTAINED OF:			
(i) SAMPLING DATE, TIME, EXACT LOCATION	☑ YES	☐ NO	☐ N/A
(ii) ANALYSES DATES, TIMES	☑ YES	☐ NO	☐ N/A
(iii) INDIVIDUAL PERFORMING ANALYSIS	☑ YES	☐ NO	☐ N/A
(iv) ANALYTICAL METHODS/TECHNIQUES USED	☑ YES	☐ NO	☐ N/A
(v) ANALYTICAL RESULTS *(e.g., consistent with self-monitoring report data)*	☑ YES	☐ NO	☐ N/A
(b) MONITORING RECORDS *(e.g.,flow, pH, D.O., etc.)* MAINTAINED FOR A MINIMUM OF THREE YEARS INCLUDING ALL ORIGINAL STRIP CHART RECORDINGS *(e.g. continuous monitoring instrumentation, calibration and maintenance records)*.	☑ YES	☐ NO	☐ N/A
(c) LAB EQUIPMENT CALIBRATION AND MAINTENANCE RECORDS KEPT.	☑ YES	☐ NO	☐ N/A
(d) FACILITY OPERATING RECORDS KEPT INCLUDING OPERATING LOGS FOR EACH TREATMENT UNIT.	☑ YES	☐ NO	☐ N/A
(e) QUALITY ASSURANCE RECORDS KEPT.	☑ YES	☐ NO	☐ N/A
(f) RECORDS MAINTAINED OF MAJOR CONTRIBUTING INDUSTRIES *(and their compliance status)* USING PUBLICLY OWNED TREATMENT WORKS. Infineum and Chemours flows	☑ YES	☐ NO	☐ N/A

SECTION H - Permit Verification

INSPECTION OBSERVATIONS VERIFY THE PERMIT. ☑ YES ☐ NO ☐ N/A *(Further explanation attached ______)*

DETAILS:

(a) CORRECT NAME AND MAILING ADDRESS OF PERMITTEE.	☑ YES	☐ NO	☐ N/A
(b) FACILITY IS AS DESCRIBED IN PERMIT.	☑ YES	☐ NO	☐ N/A
(c) PRINCIPAL PRODUCT(S) AND PRODUCTION RATES CONFORM WITH THOSE SET FORTH IN PERMIT APPLICATION.	☑ YES	☐ NO	☐ N/A
(d) TREATMENT PROCESSES ARE AS DESCRIBED IN PERMIT APPLICATION.	☑ YES	☐ NO	☐ N/A
(e) NOTIFICATION GIVEN TO EPA/STATE OF NEW, DIFFERENT OR INCREASED DISCHARGES.	☐ YES	☐ NO	☑ N/A
(f) ACCURATE RECORDS OF RAW WATER VOLUME MAINTAINED.	☑ YES	☐ NO	☐ N/A
(g) NUMBER AND LOCATION OF DISCHARGE POINTS ARE AS DESCRIBED IN PERMIT.	☑ YES	☐ NO	☐ N/A
(h) CORRECT NAME AND LOCATION OF RECEIVING WATERS. Morses Creek to Arthur Kill	☑ YES	☐ NO	☐ N/A
(i) ALL DISCHARGES ARE PERMITTED.	☑ YES	☐ NO	☐ N/A

SECTION I - Operation and Maintenance

TREATMENT FACILITY PROPERLY OPERATED AND MAINTAINED. ☑ YES ☐ NO ☐ N/A *(Further explanation attached ______)*

DETAILS:

(a) STANDBY POWER OR OTHER EQUIVALENT PROVISIONS PROVIDED.	☑ YES	☐ NO	☐ N/A
(b) ADEQUATE ALARM SYSTEM FOR POWER OR EQUIPMENT FAILURES AVAILABLE.	☑ YES	☐ NO	☐ N/A
(c) REPORTS ON ALTERNATE SOURCE OF POWER SENT TO EPA/STATE AS REQUIRED BY PERMIT.	☐ YES	☐ NO	☑ N/A
(d) SLUDGES AND SOLIDS ADEQUATELY DISPOSED. Biolog: Advanced Disposal - Greentree	☑ YES	☐ NO	☐ N/A
(e) ALL TREATMENT UNITS IN SERVICE. Haz → Sarnia, ON, Canada	☑ YES	☐ NO	☐ N/A
(f) CONSULTING ENGINEER RETAINED OR AVAILABLE FOR CONSULTATION ON OPERATION AND MAINTENANCE PROBLEMS. Use internal resources / consultants	☐ YES	☑ NO	☐ N/A
(g) QUALIFIED OPERATING STAFF PROVIDED. licenced N-4 → Bakun	☑ YES	☐ NO	☐ N/A
(h) ESTABLISHED PROCEDURES AVAILABLE FOR TRAINING NEW OPERATORS.	☑ YES	☐ NO	☐ N/A
(i) FILES MAINTAINED ON SPARE PARTS INVENTORY, MAJOR EQUIPMENT SPECIFICATIONS, AND PARTS AND EQUIPMENT SUPPLIERS.	☑ YES	☐ NO	☐ N/A
(j) INSTRUCTIONS FILES KEPT FOR OPERATION AND MAINTENANCE OF EACH ITEM OF MAJOR EQUIPMENT.	☑ YES	☐ NO	☐ N/A
(k) OPERATION AND MAINTENANCE MANUAL MAINTAINED.	☑ YES	☐ NO	☐ N/A
(l) SPCC PLAN AVAILABLE.	☑ YES	☐ NO	☐ N/A
(m) REGULATORY AGENCY NOTIFIED OF BY PASSING. *(Dates ______ ______)*	☑ YES	☐ NO	☐ N/A
(n) ANY BY-PASSING SINCE LAST INSPECTION.	☑ YES	☐ NO	☐ N/A
(o) ANY HYDRAULIC AND/OR ORGANIC OVERLOADS EXPERIENCED.	☑ YES	☐ NO	☐ N/A

Hurricanes Irene & Sandy
hydraulic energy-related (pumps)

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SECTION J - Compliance Schedules

PERMITTEE IS MEETING COMPLIANCE SCHEDULE. ☐ YES ☐ NO ☒ N/A *(Further explanation attached ______)*

CHECK APPROPRIATE PHASE(S):

- ☐ (a) THE PERMITTEE HAS OBTAINED THE NECESSARY APPROVALS FROM THE APPROPRIATE AUTHORITIES TO BEGIN CONSTRUCTION.
- ☐ (b) PROPER ARRANGEMENT HAS BEEN MADE FOR FINANCING *(mortgage commitments, grants, etc.)*.
- ☐ (c) CONTRACTS FOR ENGINEERING SERVICES HAVE BEEN EXECUTED.
- ☐ (d) DESIGN PLANS AND SPECIFICATIONS HAVE BEEN COMPLETED.
- ☐ (e) CONSTRUCTION HAS COMMENCED.
- ☐ (f) CONSTRUCTION AND/OR EQUIPMENT ACQUISITION IS ON SCHEDULE.
- ☐ (g) CONSTRUCTION HAS BEEN COMPLETED.
- ☐ (h) START-UP HAS COMMENCED.
- ☐ (i) THE PERMITTEE HAS REQUESTED AN EXTENSION OF TIME.

SECTION K - Self-Monitoring Program

Part 1 – Flow measurement *(Further explanation attached ______)*

PERMITTEE FLOW MEASUREMENT MEETS THE REQUIREMENTS AND INTENT OF THE PERMIT.	☒ YES	☐ NO	☐ N/A
DETAILS:			
(a) PRIMARY MEASURING DEVICE PROPERLY INSTALLED. Effluent Infl.	☒ YES	☐ NO	☐ N/A
TYPE OF DEVICE: ☐ WEIR ☒ PARSHALL FLUME ☒ MAGMETER ☐ VENTURI METER ☐ OTHER *(Specify ______)*			
(b) CALIBRATION FREQUENCY ADEQUATE. *(Date of last calibration* May 2015 *)*	☒ YES	☐ NO	☐ N/A
(c) PRIMARY FLOW MEASURING DEVICE PROPERLY OPERATED AND MAINTAINED.	☒ YES	☐ NO	☐ N/A
(d) SECONDARY INSTRUMENTS *(totalizers, recorders, etc.)* PROPERLY OPERATED AND MAINTAINED.	☒ YES	☐ NO	☐ N/A
(e) FLOW MEASUREMENT EQUIPMENT ADEQUATE TO HANDLE EXPECTED RANGES OF FLOW RATES.	☒ YES	☐ NO	☐ N/A

Part 2 – Sampling *(Further explanation attached ______)*

PERMITTEE SAMPLING MEETS THE REQUIREMENTS AND INTENT OF THE PERMIT.	☒ YES	☐ NO	☐ N/A
DETAILS:			
(a) LOCATIONS ADEQUATE FOR REPRESENTATIVE SAMPLES.	☒ YES	☐ NO	☐ N/A
(b) PARAMETERS AND SAMPLING FREQUENCY AGREE WITH PERMIT.	☒ YES	☐ NO	☐ N/A
(c) PERMITTEE IS USING METHOD OF SAMPLE COLLECTION REQUIRED BY PERMIT. 24-hr Composite	☒ YES	☐ NO	☐ N/A
IF NO, ☐ GRAB ☐ MANUAL COMPOSITE ☐ AUTOMATIC COMPOSITE FREQUENCY ______			
(d) SAMPLE COLLECTION PROCEDURES ARE ADEQUATE.	☒ YES	☐ NO	☐ N/A
(i) SAMPLES REFRIGERATED DURING COMPOSITING	☒ YES	☐ NO	☐ N/A
(ii) PROPER PRESERVATION TECHNIQUES USED	☒ YES	☐ NO	☐ N/A
(iii) FLOW PROPORTIONED SAMPLES OBTAINED WHERE REQUIRED BY PERMIT	☐ YES	☐ NO	☒ N/A
(iv) SAMPLE HOLDING TIMES PRIOR TO ANALYSES IN CONFORMANCE WITH 40 CFR 136.3	☒ YES	☐ NO	☐ N/A
(e) MONITORING AND ANALYSES BEING PERFORMED MORE FREQUENTLY THAN REQUIRED BY PERMIT. BOD,	☒ YES	☐ NO	☐ N/A
(f) IF (e) IS YES, RESULTS ARE REPORTED IN PERMITTEE'S SELF-MONITORING REPORT.	☒ YES	☐ NO	☐ N/A

Part 3 – Laboratory *(Further explanation attached ______)*

PERMITTEE LABORATORY PROCEDURES MEET THE REQUIREMENTS AND INTENT OF THE PERMIT.	☒ YES	☐ NO	☐ N/A
DETAILS:			
(a) EPA APPROVED ANALYTICAL TESTING PROCEDURES USED. *(40 CFR 136.3)*	☒ YES	☐ NO	☐ N/A
(b) IF ALTERNATE ANALYTICAL PROCEDURES ARE USED, PROPER APPROVAL HAS BEEN OBTAINED.	☐ YES	☐ NO	☒ N/A
(c) PARAMETERS OTHER THAN THOSE REQUIRED BY THE PERMIT ARE ANALYZED. Oil & Grease	☒ YES	☐ NO	☐ N/A
(d) SATISFACTORY CALIBRATION AND MAINTENANCE OF INSTRUMENTS AND EQUIPMENT.	☒ YES	☐ NO	☐ N/A
(e) QUALITY CONTROL PROCEDURES USED.	☒ YES	☐ NO	☐ N/A
(f) DUPLICATE SAMPLES ARE ANALYZED. 5 % OF TIME. or more	☒ YES	☐ NO	☐ N/A
(g) SPIKED SAMPLES ARE USED. 5 % OF TIME.	☒ YES	☐ NO	☐ N/A
(h) COMMERCIAL LABORATORY USED.	☒ YES	☐ NO	☐ N/A
(i) COMMERCIAL LABORATORY STATE CERTIFIED.	☒ YES	☐ NO	☐ N/A

LAB NAME Test American

LAB ADDRESS Edison, NJ

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SECTION L - Effluent/Receiving Water Observations *(Further explanation attached ______)*

OUTFALL NO.	OIL SHEEN	GREASE	TURBIDITY	VISIBLE FOAM	VISIBLE FLOAT SOL	COLOR	OTHER
DSN 002A	WWTP Clear						
Dam 1 001A	Clear to Arthur Kill						
003A	Stormwater not discharging						
004A							
005A							

Cooling water discharg to Morses Creek

(Sections M and N: Complete as appropriate for sampling inspections)

SECTION M - Sampling Inspection Procedures and Observations *(Further explanation attached ______)*

- ☐ GRAB SAMPLES OBTAINED
- ☐ COMPOSITE OBTAINED
- ☐ FLOW PROPORTIONED SAMPLE
- ☐ AUTOMATIC SAMPLER USED
- ☐ SAMPLE SPLIT WITH PERMITTEE
- ☐ CHAIN OF CUSTODY EMPLOYED
- ☐ SAMPLE OBTAINED FROM FACILITY SAMPLING DEVICE

COMPOSITING FREQUENCY ______ PRESERVATION ______

SAMPLE REFRIGERATED DURING COMPOSITING: ☐ YES ☐ NO

SAMPLE REPRESENTATIVE OF VOLUME AND NATURE OF DISCHARGE ______

SECTION N - Analytical Results *(Attach report if necessary)*

Not Applicable

EPA Form 3560-3 (9-77)